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Spectrum
Engineering (Firm)
West Butte HMO
Project, MT DSL-
AMRB No. 94-009,
Silver Bow County,
Montana

WEST BUTTE HMO PROJECT

DEQ - AMRB No. 94-009

FINAL REPORT

Silver Bow County, Montana

MONTANA
ABANDONED MINE
RECLAMATION BUREAU

December 29th, 1995

SPECTRUM ENGINEERING

Billings, Montana

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FINAL REPORT

WEST BUTTE HMO PROJECT

MT DSL-AMRB No. 94-009

Silver Bow County, Montana

Sites Located in Southwest, Montana

T3N, R8W
SW¼ SE¼ of Section 1
SE¼ of Section 9
Section 14
Section 15
Section 16
NW¼ of Section 22

December 29th, 1995

Spectrum Engineering
1413 4th Avenue North
Billings, Montana 59101

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WEST BUTTE HMO PROJECT

1. INTRODUCTION

1.1 Project Description

The West Butte HMO Project was designed to close hazardous mine openings and to abate environmental degradation at fourteen (14) sites in and around Butte, Montana. Road work and gate construction for development of a touring trail which would pass through the project area was also included. During the site investigation phase of the project mine openings at nineteen (19) additional sites in Sections 10, 14,15,16, 22 and 23 of T3N, R8W were probed, backfilled, and graded. For additional information on the sites, see the Field Investigation Report dated January 4th, 1995.

1.1.1 Location and Access

The West Butte HMO Project area is situated in Silver Bow County, Montana and is found on the 7½ minute USGS quadrangles named Butte North, Montana and Butte South, Montana. Individual sites were clustered in three areas in and around Butte. The largest group of sites was located in an area which stretches west from the Montana Tech Campus approximately 3-miles and north 1-mile from Interstate-90. These sites were located in Sections 9, 14, 15, and 16 of T3N, R8W.

Apex Site	latitude 46°01'06" and longitude 112°35'18"
Great Republic Site	latitude 46°01'02" and longitude 112°35'20"
Nemo South Site	latitude 46°01'08" and longitude 112°35'39"
Nettie Main Site	latitude 46°00'47" and longitude 112°34'35"
Nettie Incline Site	latitude 46°00'44" and longitude 112°34'58"
Olson Fraction Site	latitude 46°01'04" and longitude 112°35'21"
Plutus Site	latitude 46°01'03" and longitude 112°34'36"
Prospector Site	latitude 46°00'34" and longitude 112°34'15"

The second group of sites was located south of Interstate-90 in the hills on the south side of Silver Bow Creek. These sites were located in Section 22 of T3N, R8W. The area starts approximately ½-mile west of the I-90 overpass and extends to the west for about ½-mile along the county road south of the creek.

Atomic Site	latitude 46°00'01" and longitude 112°35'16"
Railroad Adit 1 Site	latitude 46°00'00" and longitude 112°35'07"
Railroad Adit 2 Site	latitude 46°00'00" and longitude 112°35'12"
Rising Sun Site	latitude 45°59'52" and longitude 112°35'21"
Storm King Site	latitude 45°59'57" and longitude 112°34'55"

One additional site was located in the Walkerville area in the northwest section of the city. This site was located in Section 1 of T3N, R8W.

Silversmith Site	latitude 46°02'10" and longitude 112°32'06"

1.1.2 Land Ownership

The sites are owned by the following landowners:

SITE NAME	LOCATION	LANDOWNER/CONTACT
Apex	NW¼NW¼ of Section 15, T3N, R8W in Silver Bow County	Butte Precious Metals 321 West Park St. Butte, MT 59701 Arch Dudden 2417 Yale Av. Butte, MT 59701 406-723-5802
Atomic	SW¼NW¼ of Section 22, T3N, R8W in Silver Bow County	R.W. Richter and R.H. Kearney RFD #2, P.O. Box 235 Butte, MT 59701 406-792-6286
Great Republic	NW¼NW¼ of Sec. 15 and NE¼NE¼ of Sec. 16, T3N, R8W in Silver Bow County	Butte Precious Metals 321 West Park St. Butte, MT 59701
Nemo South	SE¼SE¼ of Section 9, T3N, R8W in Silver Bow County	Butte Precious Metals 321 West Park St. Butte, MT 59701
Nettie Main	SW¼NE¼ of Section 15, T3N, R8W in Silver Bow County	West Butte Metals P.O. Box 605 Butte, MT 59703
Nettie Incline	SE¼NW¼ of Section 15, T3N, R8W in Silver Bow County	West Butte Metals P.O. Box 605 Butte, MT 59703

SITE NAME	LOCATION	LANDOWNER/CONTACT
Olson Fraction	NW¼NW¼ of Section 15, T3N, R8W in Silver Bow County	Butte Precious Metals 321 West Park St. Butte, MT 59701 Eric Nelson 2106 Duncan Dr. Missoula, MT 59801 406-728-7952 Robert & Lillian Field 7756 E. Third Scottsdale, AZ 85251
Plutus	NW¼NE¼ of Section 15, T3N, R8W in Silver Bow County	Butte Precious Metals 321 West Park St. Butte, MT 59701 Eric Nelson 2106 Duncan Dr. Missoula, MT 59801 Margaret Thomas 1620 43rd Ave. E., #3A Seattle, WA 98112
Prospector	NE¼SE¼ of Section 15, T3N, R8W in Silver Bow County	West Butte Metals P.O. Box 605 Butte, MT 59703
Railroad Adit 1	SW¼NW¼ of Section 22, T3N, R8W in Silver Bow County	R.W. Richter and R.H. Kearney RFD #2, P.O. Box 235 Butte, MT 59701 406-792-6286
Railroad Adit 2	SW¼NW¼ of Section 22, T3N, R8W in Silver Bow County	R.W. Richter and R.H. Kearney RFD #2, P.O. Box 235 Butte, MT 59701 406-792-6286
Rising Sun	SW¼NW¼ of Section 22, T3N, R8W in Silver Bow County	Robert Evan Keeling 1275 Royal Birkdale Court Rockledge, Fl 32955 407-639-1371

SITE NAME	LOCATION	LANDOWNER/CONTACT
Storm King	SE¼NW¼ of Section 22, T3N, R8W in Silver Bow County	R.W. Richter and R.H. Kearney RFD #2, P.O. Box 235 Butte, MT 59701 406-792-6286
Silversmith	SW¼SE¼ of Section 1, T3N, R8W in Silver Bow County	North Butte Mining Co. P.O. Box 188 Butte, MT 59703
Bluebird Trail	Section 15 and Section 16, T3N, R8W in Silver Bow County	Butte-Silver Bow Contact: Mark Reavis County Court House 155 West Granite St. Phone: (406) 723-8262 ext. 231

1.1.3 History

A cultural resources inventory and evaluation of all the sites which were included in the construction and investigation phases of the project was prepared by GCM Services Inc. of Butte, Montana. This report is titled, *CULTURAL RESOURCES INVENTORY AND EVALUATION: WEST BUTTE HAZARDOUS MINE OPENING RECLAMATION PROJECT* and is dated September 1994.

The mines were within the Independence mining district whose period of significance was during the 1880's and 1890's. Historically, silver was the primary ore produced although a few mines had gold ore. A few mines, mostly manganese operations, were opened in the 1920's and up into the 1940's and 1950's.

Apex - The Apex lode was first developed in the early 1880's and was reported in 1891 to have been one of the most prosperous mines in the Burlington district. The mine was also worked by the Climax Mining & Milling Co. in the late 1880's and also operated intermittently from 1907 to 1920. The mine may have opened briefly during the 1930's in a gold prospecting operation.

Great Republic - The Great Republic lode was located in the mid-1870's, being one of the early lode discoveries. It was worked some but ran into difficulty. A large open cut was developed in the 1920's.

Nemo South - The mine was little more than a prospect and there are no records indicating that the mine ever became a significant producer.

Nettie Main - The Nettie was first developed around 1881 by the Colorado Mining Co., and then purchased by the Colorado Mining & Smelting Co. It operated successfully until 1885 when it was closed. The ACM owned the property in 1917 and was actively mining the property.

Nettie Incline - The shaft was an auxiliary opening to the Nettie working on the west side of the Nettie's main operation.

Olson Fraction - The mine was patented in 1920. It does not appear that the site was ever developed and never produced significant amounts of ore.

Plutus - The lode was patented in 1890. The mine was reported to have shipped ore in 1919 & apparently operated for 2 more years before shutting down in 1921. In 1952 the 500 foot shaft was reopened in order to provide access to the Norwich mine workings which were mined during the 1950's.

Prospector - The site was patented in 1882 but was later operated as part of the Minnie Jane.

Atomic - The Atomic was most likely a small unpatented prospect operations. The appearance of the structures indicate the mines may have been worked during the 1920's & 1930's.

Railroad Adit 1 -The Railroad Adit 1 was most likely a small unpatented prospect operation. The appearance of the structures indicate the mines may have been worked during the 1920's & 1930's.

Railroad Adit 2 -The Railroad Adit 2 was most likely a small unpatented prospect operation. The appearance of the structures indicate the mines may have been worked during the 1920's & 1930's.

Rising Sun - The mine was patented in 1902 and a discovery shaft was sunk. Development work may have been done on the shaft during the 1920's but no significant production apparently resulted.

Storm King Mine - The mine was a small unpatented mining operation which may have been worked during the 1920's & 1930's. There is no indication the mine ever produced significant amounts of ore.

Silversmith - The mine was patented in 1882, closed and not opened again until the 1930's & 1940's and reportedly produced a rich silver and gold ore.

1.2 Project Objectives

The project objective was to close hazardous mine openings located around Butte, Montana. Most of the sites were initially inventoried by Piper and Associates in 1989. The Piper report suggested that many of the shafts in the project area had been covered with surface bulkheads when they were abandoned.

2. RESPONSIBLE PARTIES

2.1 Contractor

The successful bidder was Baxter Construction. Their address is shown below:

Baxter Construction
4014 Hardin Road
Billings, MT 59101
Phone: 406/259-6404

2.2 Reclamation and Engineering Plan

Spectrum Engineering was assigned the responsibility of preparing engineering plans and specifications for this project.

Spectrum's address is shown below:

Spectrum Engineering
1413 4th Avenue North
Billings, Montana 59101
Phone: 406/259-2412

2.3 Quality Control Inspection

Spectrum Engineering performed the quality control inspection. Dave Murja and Bill Maehl performed project engineering functions and Arnie Knight acted as the construction inspector.

Spectrum's address is shown below:

Spectrum Engineering
1413 4th Avenue North
Billings, Montana 59101
Phone: 406/259-2412

2.4 AMRB Coordination

The AMRB Project Manager during the construction phase of the project was Jack Yates, Montana Department of Environmental Quality, Abandoned Mine Reclamation Bureau. Dan Koszuta of the AMRB handled the project during the site investigation and preliminary design phase.

3. CHRONOLOGICAL LISTING OF EVENTS

3.1 Pre-Bid Conference

A pre-bid conference was held at the site near Butte on August 1st, 1995. Jack Yates represented the AMRB and Dave Murja represented Spectrum Engineering. The meeting was attended by four prospective bidders. All but one of the contractors who submitted bids were in attendance.

3.2 Bid Date

The bid opening date was August 10th, 1995 at 2:00 p.m. at the Montana Department of Environmental Quality, Abandoned Mine Reclamation Bureau's office, 1625 Eleventh Avenue, Helena, Montana.

3.3 Lowest Bids

Four (4) qualified bidders responded to the solicitation. Bidders included: Baxter Construction, H&H Contracting Inc., Marquis Excavating, and Hydrometrics, Inc. The low base bid of $97,535.05 was submitted by Baxter Construction. The remainder of the bids ranged from $132,000 to $235,544. The Engineer's base estimate was $130,667.80. A bid for possible additive work items was also requested in the solicitation. With the additive work items included in the total bid, Baxter Construction was still the low bidder at $122,085.05. The remainder of the total bids ranged from $148,110 to $245,044. The Engineer's total estimate was $138,687.80. The bid tabulation is presented in ATTACHMENT 1.

3.4 Contract Award

The contract was awarded to Baxter Construction of Billings, Montana who was the low bidder. The contractor's address is shown under 2.1 Contractor above.

3.5 Contract Agreement

The Contract Agreement was signed September 5th, 1995. The Notice to Proceed was issued for a starting date of September 27th, 1995. The term of the contract was to be forty-five (45) consecutive calendar days.

3.6 Construction Start-up

A Pre-Award Conference was not held for this project because the Contractor had attended the Pre-Bid Conference which had included a thorough tour and discussion of the sites. Baxter Construction started work on October 4th, 1995

3.7 Change Orders

One Change Order were written for this project. A copy of the Change Order is included in

ATTACHMENT 2 of this report. Change Order No. 1 was issued to make adjustments to correct the estimated quantities to actual measured quantities for completed bid items. Bid unit prices were used for the adjustment of bid and actual quantities which amounted to a net decrease of $5,701.50 for the project.

3.8 Work Stoppages

Baxter Construction started work on October 4th, 1995 and completed work on November 10th, 1995, using 39 day out of the contract period of 45 days.

3.9 Requests for Payment

Only the final request for payment was made during this project. A copy of the Pay Request is included in ATTACHMENT 3. The payment amount for this request is shown below:

Final	10/04/1995 to 11/10/1995	$105,319.71

3.10 Substantial Completion

The date of Substantial Completion was November 10th,1995.

3.11 Final Completion and Approval

A field inspection by the AMRB took place on November 2nd, 1995. Substantial completion was issued on November 10th, 1995.

3.12 Final Payment

Final payment was made to the Contractor in December 1995. A copy of the payment request has been included in ATTACHMENT 3.

4. CONSTRUCTION

4.1 Description of Project Plan

A brief description of each of the sites is presented below. This description provides information on access, describes the openings and other site features which were present, and presents the intended work plan. The project area was situated in Silver Bow County, Montana. Individual sites were clustered in three areas in and around Butte.

4.1.1 Group 1 Sites - West of Montana Tech Campus

Group 1 sites were generally accessed from mine access roads branching off the old Butte to Rocker Road. The Butte to Rocker Road runs from the west end of Park Street to the Rocker interchange on Interstate-90. In addition to providing site access, this road was the primary route between Group 1 sites and the county landfill.

Apex Site.

Description - The Apex Site was located in the NW¼NW¼ of Section 15 in T3N, R8W. This site can be accessed by driving through the Montana Tech campus on Park Street to where the pavement ends and the Butte To Rocker Road begins at the west edge of the campus. Proceed west for 0.44 miles to a fork in the road. Take the north branch and travel in a northwesterly direction 1.02 miles to where another road branches off the southwest side of the road. On this fork, drive another 0.49 miles to the site which is situated along the top of a ridge.

The site consisted of Apex #1, which was a group of associated mine openings, and Apex #2, which was an open shaft. The Apex #1 mine openings included an inclined shaft, a trench, and four small pits. A large dump was associated with these openings. These features lie a short distance off the road. The shaft designated Apex #2 was situated near the top of a ridge and 600-feet east of the road. Hazard abatement at the Apex Site was to be achieved by completely plugging the incline with backfill and by completely backfilling each of the other openings.

The Apex #1 inclined shaft was 9 feet by 14 feet at the collar. The opening sloped downward 24 feet at a steep angle before turning and continuing underground on a gentle decline. Because the footwall was cut on a shallower grade (approx. 1H:1V) than the headwall, the size of the opening gradually tapered to 3 feet by 4 feet near the bottom. The Apex #1 trench was a 65 foot long, wedge-shaped cut which had been cut up the nose of a ridge. The deepest section of the trench was situated on the downhill end where the cut was 12 feet deep, 10 feet wide at the bottom, and 35 feet wide at the surface. Forty feet from the downhill end of the trench, the cut was 7 feet deep, less than a foot wide at the bottom, and 29 feet wide at the surface. At the uphill end, the width and depth of the cut gradually tapered to the surface. The four shallow pits were located between the trench and the road. These pits were 2-3 feet deep and 6-10 feet in diameter.

The Apex #2 shaft was located on 3H:1V slope and was 5 feet by 19 feet at the collar. The opening stayed about this size for 18 feet then abruptly decreased to 4 feet by 4 feet before dropping another 4 feet to the bottom of the shaft. A small opening in the west wall of the shaft headed toward the east. Waste material was heaped along the downhill edge of the shaft.

Backfill Mine Openings - The Apex #1 inclined shaft, trench and four pits were to be backfilled to the surface using material from the dump located less than 100 feet away. It was estimated that the inclined shaft would require 60 cubic-yards of backfill, the trench would require 280 cubic-yards of backfill, and the four prospect pits would require 15 cubic-yards of backfill. All backfill surfaces were to be graded to blend with the surrounding contours. Areas on the dump which would be

disturbed for borrow excavation were to be regraded with maximum 2H:1V slopes.

The Apex #2 shaft was to be backfilled to the surface using material from the associated dump and from the adjacent area. It was estimated that this vertical shaft would require 75 cubic-yards of backfill. The entire dump was to be used in this operation. The area disturbed by construction was to be regraded to blend with the surrounding contours. Regraded slopes were not to exceed 2½H:1V.

Seed and Fertilize - The disturbed areas were to be seeded and fertilized. Approximately 0.23 acres would need to be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer were to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area was to be tracked or raked.

Great Republic Site

Description - The Great Republic Site was located in the NW¼ NW¼ of Section 15 in T3N, R8W and the NE¼NE¼ of Section 16 of T3N, R8W. This site was in the Gimlet Gulch area approximately 400 feet south of the Apex Site.

The site consisted of four (4) hazardous mine openings which would be closed and a large open-cut which would not be reclaimed under this project. These features were about 300 feet off the established road. Hazard abatement at the Great Republic Site was to be achieved by completely backfilling each of the four (4) hazardous mine openings.

The Great Republic #2 was a previously backfilled shaft which has subsided producing a 16 foot deep sinkhole. This opening was 7 feet in diameter at the surface. This reduced to 4 feet in diameter approximately 6 feet below the surface. It was located at the eastern edge of the open-cut. The large dump at the east end of the open cut might have been associated with this shaft since it was only 40 feet away from it.

Great Republic #3 was a 40 foot long wedge-shaped cut that ranged from 7 feet to 16 feet in width. In the endwall of the cut, where it was 8 feet deep, a partially plugged adit continued underground. No dump was associated with this opening; but, there was ample dump material about 100 feet to the south in the dump associated with Great Republic #2. A trail coming up from the bottom of the draw ran to the bottom end of the cut.

Great Republic #4 consisted of a partially blocked inclined adit which was situated below the pit wall of a shallow 12' x 12' surface excavation. The underground opening had an irregular shape; but, it was roughly 10' x 4' in cross section and was 15 feet deep where it appeared to angle off toward the west and choked off. The surface excavation averaged 3 feet in depth. The Great Republic #4 was located near the bottom of a little draw and probably caught all of the runoff from this area. It was located between the Great Republic #3 and the steep bank of Gimlet Gulch's dry stream bed. Dump material from this opening was piled along the west edge of the excavated area and spilled down the stream bank. Another section of dump extended to the north for 200 feet along the stream bank.

Great Republic #5 was located on the east side of Gimlet Gulch and was directly across from the Great Republic #4. A road which comes down Gimlet Gulch passed along the uphill edge of it. The opening was a 13 foot deep vertical 9' x 6½' shaft. There was about a pickup load of wood and an old washing machine in the bottom of the shaft. An 8' x 8' dump that averaged about 3 feet in depth was located between the shaft and the road. The dump was only large enough to fill one quarter of the opening.

Backfill Mine Openings - The Great Republic #2 shaft was to be backfilled using material from the nearby dump. Backfill was to be mounded approximately 3-feet high over the opening. The

area disturbed by construction was to be regraded to blend with the surrounding contours. Regraded slopes on the backfill mound were not to exceed 3H:1V. Areas on the dump which were disturbed by borrow excavation were to be regraded with maximum 2H:1V slopes. Prior to backfilling, the shaft were to be probed with a backhoe or other equipment capable of probing the opening to a minimum depth of 20-feet. With anticipated additional induced subsidence produced by the probing operation, it was estimated that the total backfill quantity would be approximately 40 cubic-yards.

The Great Republic #3 cut and adit were to be backfilled to the surface using material from the nearby dump. The backfill surface was to be graded to blend with the surrounding contours. It was estimated that this opening would require 90 cubic-yards of backfill.

The incline at the Great Republic #4 was to be completely backfilled. The surface excavation associated with the incline would then be filled and graded as a large mound cresting approximately 3 feet above the natural ground surface. Slopes on the backfill area were to be 3H:1V or less. The immediate area was to be graded and contoured as necessary to carry surface drainage around the backfilled area while maintaining a smooth drainage profile. Material from the adjacent dump and from the nearby dump located to the west were to be used for backfill. Backfill requirements were estimated at 20 cubic-yards to fill the underground opening plus 40 cubic-yards to backfill and grade the surface cut. Areas on the dumps which had to be disturbed by borrow excavation were to be regraded with maximum 2H:1V slopes.

The Great Republic #5 shaft was to be backfilled with material from the adjacent dump and by borrowing from the surrounding area. Backfill was to be mounded approximately 2-feet high over the opening. It was estimated that this opening would require 35 cubic-yards of backfill. The entire adjacent dump was to be placed in the opening. The area disturbed by construction was to be regraded to blend with the surrounding contours. Regraded slopes on the backfill mound and borrow area were not to exceed 3H:1V.

Probe Mine Openings - Prior to backfilling the Great Republic #2 shaft, this opening was to be probed to a depth of 20 feet below the collar. Probing the opening was to be accomplished by digging out the material which had caved or otherwise collected in the underground opening. A backhoe or excavator with a long reach and a 1-2 yard bucket would be well suited for this operation.

Debris Cleanup - Prior to backfilling the Great Republic #5 shaft, trash in the opening was to be removed so any drifting at the bottom of the opening could be filled. Nonbiodegradable trash was to be crushed and buried in the opening. Wood could be disposed of by burning and dumping the ashes back into the opening. However, the Contractor could select to haul the debris to the local landfill.

Seed and Fertilize - All areas disturbed by construction at the Great Republic #2, #3, #4, and #5 were to be seeded and fertilized. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded areas were to be tracked.

Nemo South Site

Description - The Nemo South Site was located in the SE¼SE¼ of Section 9 in T3N, R8W. This site can be accessed by driving through the Montana Tech campus on Park Street to where the pavement ends and the Butte To Rocker Road begins at the west edge of the campus. Proceed west for 0.44 miles to where the road forks. On the north fork first travel 1.02 miles in a northwesterly direction. Then proceed 0.38 miles in a westerly direction to where the road forks. At this fork, turn to the south. The Nemo South Site was 0.35 miles down this fork in the road.

The road went right through the middle of the site.

The site consisted of a shaft, which had caved, a group of dumps extending around the opening, and seven pits or depressions. Hazard abatement at the Nemo South Site was to be achieved by backfilling each of the depressions and the caved shaft. A large mound would to be placed over the shaft; and, the road was to be re-routed to the east to move it away from the shaft.

The Nemo South shaft had caved producing an 15 foot deep subsidence cone that was 33-38 feet in diameter measured at the original ground surface. At the bottom, the cone was 6 feet in diameter. The shaft timbers were exposed in the bottom. There was approximately one cubic-yard of debris in the depression. Dump material was piled all around the shaft with major lobes extending to the east and to the west. The road cut between the two lobes passing along the east edge of the subsidence cone.

Pit 1 was cut on the slope below the east side of the road. It averaged 5 feet in depth, had a top diameter of 20-27 feet, and had a bottom area of 8' x 2'. Pit 2 was situated near the northeast edge of the shaft. It was only 2-3 feet in depth, had a top diameter of 20 feet, and had a bottom diameter of 5 feet. Pit 3 was located 35 feet north of the shaft. It was a wedge-shaped cut that reached a depth of around 5 feet. It was 24 feet long, 12-19 feet wide at the surface, and 10-6 feet wide at the bottom.

Depressions A, B, and C were each roughly 2 feet deep and 5 feet in diameter near the surface. Waste material was mounded around these openings. Depression D was situated along the north toe of the west lobe of the dump. This depression was around 45 feet in length and was V-shaped with a top width of 8 feet.

Debris Cleanup - Prior to backfilling the shaft, trash in the bottom of the subsidence cone would be removed and hauled to the county landfill. There was about one cubic-yard of debris.

Backfill Mine Openings -The Nemo South caved shaft was to be backfilled using approximately 360 cubic-yards of material from the adjacent dumps. Backfill over the shaft was to be mounded approximately 6-feet above the elevation of the adjacent road. In addition, seven (7) pits or depressions on the site were to be backfilled to the surface using material from the adjacent or nearby dumps. It was estimated that Pit-1 would require 22 cubic-yards of backfill; Pit-2 would require 12 cubic-yards of backfill; Pit-3 would require 33 cubic-yards of backfill; and Depressions A, B, C, and D would require a total of 40 cubic-yards of backfill. Disturbance to the large dump on the east side of the road was to be limited to approximately 50 cubic-yards of excavation which was required for relocation of the road. All other dumps were to be either totally or partially consumed for borrow. All areas disturbed by construction were to be regraded to blend with the surrounding contours. Regraded slopes on the dump and the backfill mound were not to exceed 2½H:1V. It was estimated that the backfill operation would require the regrading of 0.321 acres.

Road Relocation - The edge of the backfill mound over the shaft was expected to encroach upon a portion of the existing site access road. Consequently 150-feet of this road was to be relocated east of it's original location. The present road was an unsurfaced one-lane trail. The relocated section of road was to be 12-feet wide and was to be constructed on fill from the dump on the east side of the current road. It was estimated that there would be 50 cubic-yards of cut along the edge of the dump and around 20 cubic yards of fill. All excess cut material was to be used for shaft backfill. Cut slopes were to be graded at 3H:1V and fill slopes were to be graded at 2H:1V. The road profile in the relocated section would maintain a reasonably constant grade along it's entire length.

Seed and Fertilize - All disturbed areas except the running surface on the road were to be seeded and fertilized. Approximately 0.34 acres would need to be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area was to be tracked.

Nettie Main Site

Description - The Nettie Main Site was located in the SW¼NE¼ of Section 15 in T3N, R8W. This site can be accessed by driving through the Montana Tech campus on Park Street to where the pavement ends and the Butte To Rocker Road begins at the west edge of the campus. You then proceed west for 0.67 miles to a mine access road which joins the road from the northwest. The mine access road connects both this site and the Hibernia borrow area with the Butte to Rocker Road. The Nettie Main Site lies about 450 feet up the access road. The site consisted of one (1) caved shaft and a large dump. Hazard abatement at the Nettie Main Site was to be achieved by backfilling the subsidence cone and mounding fill over the shaft.

The 900 foot deep Nettie Main shaft had caved producing a 8 foot deep subsidence cone that was 36-38 feet in diameter measured at the top and 10-18 feet in diameter measured at the bottom. The shaft was situated on sloping ground and there were large dumps above and below the opening. The dump at the Hibernia borrow area was on the road 300 feet to the north.

Backfill Mine Openings - The Nettie Main shaft was to be backfilled using material from the northeast corner of the Hibernia dump. The backfill was to be mounded 10-feet above the dump elevation on the southeast side of the shaft and about 1-feet above the existing ground elevation of the bench on the northwest side of the shaft. It was estimated that this caved shaft would require 1600 cubic-yards of backfill. All backfill surfaces were to be graded to blend with the surrounding contours using slopes not exceeding 3H:1V. It was estimated that 0.16 acres in the borrow area were to be graded with maximum 2H:1V slopes.

Seed and Fertilize - Borrow area seeding would not be required. However, the backfill area which was estimated to contain approximately 0.23 acres would need to be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area was to be tracked.

Nettie Incline Site

Description - The Nettie Incline Site was located in the SE¼NW¼ of Section 15 in T3N, R8W on the ridge between Whiskey and Gimlet Gulches. The Butte to Rocker Road passes 250 feet south of the site. This site can be accessed by driving through the Montana Tech campus on Park Street to where the pavement ends and the Butte To Rocker Road begins at the west edge of the campus. You then proceed west for 0.91 miles to where a road branches off the north side of the main road. This road passes along the north edge of the site 0.23 miles from where it leaves the main road. The site consisted of one (1) caved inclined-shaft with a collapsed concrete portal-housing and a large dump. Hazard abatement at the Nettie Incline Site was to be achieved by backfilling the subsidence cone and mounding fill over the shaft.

The Nettie Incline had caved leaving a large subsidence depression. The subsidence depression was oval in shape. Measured at the surface, the hole was 77 feet across its major axis and 50 feet across its minor axis. All sides sloped inward dropping 18-19 feet to a 10' x 29' base. The structural-concrete sections of the portal-housing had slide into the depression and were sitting askew on the bottom and western slope. Waste dumps extended around the opening. The access road passed along the uphill edge of the site about 50 feet from the opening.

Backfill Mine Openings - The subsidence depression associated with the caved Nettie Incline was to be backfilled using material from he adjacent dump. The backfill was to be mounded over the opening and was to be graded to provide positive drainage in all directions. It was estimated that the depression and mound would require 1400 cubic-yards of backfill. All disturbed surfaces were to be graded to blend with the surrounding contours. Areas on the dump which would disturbed for borrow were to be regraded with maximum 2½ H:1 V slopes.

Seed and Fertilize - The disturbed areas were to be seeded and fertilized. Approximately 0.53 acres would need to be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area was to be tracked.

Olson Fraction Site

Description - The Olson Fraction Site was located in the NW¼NW¼ of Section 15 in T3N, R8W. The site was in the Gimlet Gulch area between the Apex and Great Republic sites. The site consisted of two (2) mine openings and their associated dumps. These features were located 200-300 feet off the road. Hazard abatement at the Olson Fraction Site was to be achieved by removing a small structure and completely backfilling each of the openings.

The Olson Fraction #1 appeared to be a plugged shaft that had been fairly shallow. A very small dump was associated with it. All that remained was a 8' x 8' x 3' deep hole with a timber structure above it. The structure consisted of two 10 foot long 10" X 10" timbers supported by four posts. There was a 4' x 4' room at one end that was enclosed with lagging and tin. This opening was located about 300 feet off the established road. It was situated on a south facing slope 240 feet south of the Apex #1.

The Olson Fraction #2 was a 20 foot deep shaft that had caved around its collar. At the surface the opening was 20 feet in diameter. The size of the opening tapered down to about 5' x 5' as it dropped in the first 5 feet and continued to the bottom with those dimensions. The dump extended out into the drainage on the east side of the shaft. This opening was located approximately 200 feet southwest of Olson Fraction #1. It was 150 feet off the established road.

Structure Removal - One structure at the Olson Fraction #1 was to be completely dismantled and removed from the site. The dismantled structure was to be hauled to the local landfill.

Backfill Mine Openings - The Olson Fraction #1 opening was to be backfilled to the surface with material from the adjacent mine dump. It was estimated that this opening would require 7 cubic-yards of backfill. The area disturbed by construction was to be regraded to blend with the surrounding contours. The entire dump on the downhill side of the opening would be consumed in this operation. All regraded areas were to be contoured with maximum 2½H:1V slopes.

The Olson Fraction #2 shaft was to be backfilled to the surface with material from the adjacent mine dump. It was estimated that this opening would require 35 cubic-yards of backfill. The area disturbed by construction was to be regraded to blend with the surrounding contours. The entire dump associated with the opening was to be consumed in this operation. All regraded areas were to be contoured with maximum 3H:1V slopes.

Seed and Fertilize - The disturbed areas were to be seeded and fertilized. Approximately 0.03 acres would need to be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area was to be tracked.

Plutus Site

Description - The Plutus Site was located in the NW¼NE¼ of Section 15, T3N, R8W. This site is located on the south side of Gimlet Gulch and can be accessed by driving through the Montana Tech campus on Park Street to where the pavement ends and the Butte To Rocker Road begins at the west edge of the campus. You then proceed west for 0.44 miles to where the road forks. On the north fork, travel in a northwesterly direction 0.41 miles to the Plutus access road which branches off the north side of the road. The site is located about 650 feet up the access road. The

site consisted of one (1) covered mine shaft. A large dump is associated with this opening. The opening was within 150 feet off the established road. Hazard abatement at the Plutus Site was to be achieved by backfilling and installing a Tri-deck beam shaft closure.

The Plutus shaft was utilized through 1957. The shaft was covered with a 16' x 17' surface bulkhead that had soil piled over it. In 1982 the surface bulkhead was inspected and a breather pipe was installed. The bulkhead was constructed by laying 4" x 12" planks across 5 timber beams. These beams were treated 10" x 11" timbers. One corner of the bulkhead had sagged. This shaft was 9' x 11' and was heavily timbered and lined. The shaft was reported to extend to a depth of roughly 400 feet. However, the shaft was obstructed 33-feet below its collar. Concrete footing and foundations from the head frame and hoist house are situated at the south end of the site. The large dump surrounds the shafts with lobes extending down the slopes of Gimlet Gulch to the north and west of the opening.

Bulkhead and Shaft Timber Removal - The 16' x 17' surface bulkhead on the Plutus shaft was to be uncovered, dismantled, and removed from the site. Approximately 6 cubic-yards of earth that had been mounded over the bulkhead was to be excavated and used later as grading fill. During the dismantling operation care was to be taken to preserve the shaft collar and to avoid dropping bulkhead components into the shaft. All debris from this operation was be collected and hauled to the local landfill unless components were salvaged and removed from the site by the Contractor. It was estimated that the bulkhead debris would consist of five (5) 10" x 11" x 16' treated timbers, eight (8) 4" x 12" x 17' planks, twenty (20) 2" x 10" x 17' planks, and one (1) 6' x 6" dia. pipe. After any portion of the bulkhead had been removed, the Contractor was to take all appropriate measures to protect his personnel and the public from all hazards associated with the open shaft.

Backfill Mine Opening - The Plutus shaft was blocked 33-feet below the surface. The open portion of the shaft was to be backfilled to the surface with material excavated from the dump lobes located northeast of the shaft. In addition, an area between the two dump lobes was to be filled to the collar elevation of the shaft and recontoured to blend with the adjacent borrow areas on the dump. It was estimated that the shaft would require 120 cubic-yards and the fill area on the dump would require 40 cubic-yards of backfill. If the fill subsided inside the shaft during this operation, the backfill requirements would be increased. Areas on the dump which were disturbed by borrow excavation were to be regraded with maximum 2½H:1V slopes after the Tri-deck beam shaft closure had been completed.

Tri-Deck Beam Shaft Closure - The Contractor would install a 31' x 36' shaft cover using 6 prestressed Tri-Deck concrete beams conforming with AASHTO HS20 loading (intermediate bridge sections). The installation would conform to all requirements of the Special Technical Specification for Tri-Deck Beam Shaft Closure which was prepared for this project. The concrete section shaft closure would include the following work elements:

(1) Level a 32 ft x 36 ft area surrounding the shaft at the collar elevation.

(2) Excavate for footings and install forms for 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1½" . The footing was to be level and was to be installed with the bottom 8-inches below grade.

(3) Construct reinforced concrete footers to level and support Tri-Deck Beams. Approximately 7.8 cubic-yards of 3000 PSI concrete would be required. Longitudinal reinforcement would consist of 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Additional reinforcement were to be provided at all corners with #5 - 20" x 20" corner bars matched to the longitudinal reinforcement.

(4) Improve access as required to deliver and install channel sections.

(5) Furnish, deliver and install Tri-Deck Beams. Each beam would be 31 feet in length, 1' 4" in depth, and approximately 6 feet wide. Each beam would weigh approximately 21,000 pounds. The precast Tri-Deck beams were to be laid edge to edge on the concrete footers and fastened in-place. Precast endwalls were to be installed at the ends of each beam.

(6) Backfill around shaft closure to provide a 2H:1V slope.

Seed and Fertilize - All disturbed areas around the shaft closure were to be seeded and fertilized. Approximately 0.38 acres would need to be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area was to be tracked.

Prospector Site

Description - The Prospector Site was located in the NE¼SE¼ of Section 15, T3N, R8W. This site is situated west of the World Museum Mining in Whiskey Gulch. It can be accessed by driving to the south end of the parking lot at the World Museum of Mining and then continuing across the railroad crossing. Just past the crossing you turn west onto a road which runs along the toe of the railroad grade south of the museum. This road passes along the south edge of the Prospector Site 0.44 miles from the railroad crossing. The site consisted of one (1) covered mine shaft. A large dump was associated with this opening. The opening was within 100 feet of an established road. Hazard abatement at the Prospector Site was to be achieved by backfilling the top section of the shaft and then capping the shaft with a Tri-deck beam shaft closure.

The Prospector shaft was utilized in conjunction with the Minnie Jane which was located 600 feet to the southwest. The shaft had been covered with a timber bulkhead which was about 4-feet below the surface. The bulkhead was buried beneath a pile of earth. The shaft had two compartments and was 12' x 7'. It was reported to extend to a depth of 810 feet. However, there was a deck 16-feet below the surface and a blockage about 39-feet below the surface. The shaft was heavily timbered and lined. Concrete footings from the head frame and hoist are situated south of the shaft. The large dump occupied a large area between the railroad grade and the road.

Bulkhead and Shaft Timber Removal - The Prospector shaft was to be uncovered and the top two bulkheads in the shaft were to be dismantled. Approximately 22 cubic-yards of earth which had been mounded over the first bulkhead was to be removed. The first bulkhead which consisted of 2-inch planks laid across the first intact set of horizontal timbers inside the 12' x 7' shaft could then be removed. Next a second deck consisting of planks laid loosely across the horizontal timbers at about 16-feet below the surface was to be removed. Finally, any lagging around the shaft that extended above the base elevation of the proposed cap was to be cut off. All debris from these operations would be collected and hauled to the local landfill unless salvaged and removed from the site. After any portion of the bulkhead was removed, the Contractor would take all appropriate measures to protect his personnel and the public from all hazards associated with the open shaft.

Backfill Mine Opening - The Prospector shaft appeared to be blocked approximately 39-feet below the surface. The opening was to be backfilled to the surface with approximately 120 cubic-yards of material from the adjacent dump. Because the shaft was situated about 5-feet from the toe of the dump, material that would interfere with the cover installation would be used for backfill. If the fill happened to subside inside the shaft during this operation, the shaft would be backfilled until it choked at the collar.

Dump Excavation - Approximately 230 cubic-yards of material was to be excavated from the dump in order to provide room for the Tri-deck beam shaft closure. Part of the dump was to be utilized as a borrow source for backfilling the mine opening. Any material that could not be utilized for shaft

backfilling (approximately 110 cubic-yard of excavation) would be considered as dump excavation. This material would be added to existing piles on the dump or would be dumped along the outside slope of the dump. The excavated dump face along the Tri-deck beam shaft closure was to be regraded with maximum 2H:1V slopes.

Tri-Deck Beam Shaft Closure - The Contractor would install a 31' x 36' shaft cover using 6 prestressed Tri-Deck concrete beams conforming with AASHTO H20 loading (intermediate bridge sections). The installation would conform to all requirements of a Special Technical Specification for Tri-Deck Beam Shaft Closure which was prepared for this project. The concrete section shaft closure would include the following work elements:

(1) Level a 32 ft x 36 ft area surrounding the shaft at the collar elevation.

(2) Excavate for footings and install forms for 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1½" . The footing were to be level and were to be installed with the bottom 8-inches below grade.

(3) Construct reinforced concrete footers to level and support Tri-Deck Beams. Approximately 7.8 cubic-yards of 3000 PSI concrete would be required. Longitudinal reinforcement would consist of 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Additional reinforcement were to be provided at all corners with #5 - 20" x 20" corner bars matched to the longitudinal reinforcement.

(4) Improve access as required to deliver and install channel sections.

(5) Furnish, deliver and install Tri-Deck Beams. Each beam were to be 31 feet in length, 1' 4" in depth, and approximately 6 feet wide. Each beam would weigh approximately 21,000 pounds. The precast Tri-Deck beams were to be laid edge to edge on the concrete footers and fastened in-place. Precast endwalls were to be installed at the ends of each beam.

(6) Backfill around shaft closure to provide a 2H:1V slope.

Seed and Fertilize - The excavated portion of the dump and all areas around the shaft closure which have been disturbed by construction were to be seeded and fertilized. Approximately 0.093 acres would need to be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area were to be tracked.

4.1.2 Group 2 Sites - South of Interstate 90

Group 2 sites are located in Section 22 of T3N, R8W. These sites are accessed by driving west on Centennial Avenue past the sewage treatment plant. Near the northwest corner of the Colorado Tailings and about 0.14 mile from where Centennial Avenue joins Excelsior Street, you turn off the west side of Centennial onto an unpaved county road which follows Silver Bow Creek west toward Rocker. The county road passes beneath an elevated section of Interstate 90 and continues along the north side of Silver Bow Creek for approximately one mile to a point where it makes a sharp turn to the south and crosses the creek and a railroad track running along the south side of the creek. After crossing the track, the road joins another section of county road

running along the south side of Silver Bow Creek. To reach the Group 2 sites, you cross Silver Bow Creek and turn west at the intersection. The sites stretch for a distance of 0.6 mile along this section of the county road.

Atomic Site

Description - The Atomic Site was in the SW¼NW¼ of Section 22, T3N, R8W and was situated adjacent to the county road which runs along the south side of Silver Bow Creek. It was located approximately 1.6 mile west of the Centennial Avenue turnoff. The site consisted of a surface excavation, a shaft and a partially collapsed adit. A powerline which runs along the hillside crossed over the site. Hazard abatement at the Atomic Site was to be achieved by removing the timbers from the shaft and adit, backfilling the openings, and regrading the entire site.

The collapsed portion of the 4' X 4' adit was 42 feet long. The posts and timbers were sticking up through the collapsed area. Behind the caved portion of the adit, another 29 feet of depression continued uphill.

The shaft was located 40-50 feet from the road and was about 13 feet higher in elevation. The shaft was only 15 feet from the caved adit. The shaft was lined to 5' x 7' and extended to a depth of 13 feet. Approximately 3 feet of water was found at the bottom of the shaft. There was a wood deck over the shaft collar and a 8 foot high headframe above the deck. The shaft collar was caved to the edge of the deck. A small amount of waste material had been dumped around the shaft. The shaft was only 6 feet from the powerline.

A wedge-shaped surface excavation was situated between the road, the shaft and the caved adit. This excavation was roughly 35' X 30' and had a maximum depth of 11 feet. Its bottom was 1-2 feet below the elevation of the road. The top of the cut was 8 feet from the shaft. The east side of the cut was situated along the edge of the caved adit. Debris had been dumped in the cut.

Structure Removal - The headframe at the Atomic was to be completely dismantled and removed from the site. The dismantled structure was to be hauled to the local landfill. It consisted of five 7' to 12' long timbers (8"-12" square) and two short timber pilings. Any salvageable materials would become the Contractor's property.

Bulkhead and Shaft Timber Removal - The surface deck (approx. 8' x 10') and the top 13 feet of timbers and wood planks lining the shaft would be removed from the shaft. All debris from these operations would be collected and hauled to the local landfill.

Debris Cleanup - Debris (approx. 8 CY) in the cut below the shaft would be hauled to the county landfill.

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area would be stripped of vegetation and other objectionable materials. The refuse resulting from this operation was to be treated as debris and would be hauled to the local landfill. It was anticipated that only a portion of the total area would be affected by this operation. An estimated 0.062 acres would be affected.

Salvage and Replace Topsoil - All recoverable topsoil would be stripped from the area which was to be disturbed by site grading and backfilling. An estimated 50 cubic-yards of soil was to be salvaged, stockpiled, and later replaced on the regraded area. Cover soil was to be respread evenly over the entire regraded area and brought to a friable condition ready for seeding.

Backfill Mine Openings - The shaft was to be eliminated partially by regrading and partially by backfilling with material borrowed from the adjacent area (approx. 15 CY).

The surface cut between the road and the shaft was to be utilized as a borrow source for the Railroad Adit 2 Site and would supply approximately 40 cubic-yards of material from it's southeast corner. However, the surface cut was to be backfilled as part of the Atomic Site reclamation. It was estimated that 60 cubic-yards of backfill would be required to recontour the cut with maximum 3H:1V slopes.

Adit Demolition and Backfilling - The first 54 feet of the adit would be completely demolished by digging-out the adit timbers and lagging. The adit excavation would begin at the portal where the adit roof was partially caved and extend into approximately 6 feet of cover at the end. It would not be necessary to remove 100-percent of the timbers from the excavation; however, timbers left in the opening could not interfere with effective backfilling and grading. Mine timbers and other debris removed from the adit were to be hauled to the local landfill. It was anticipated that approximately 75 cubic-yards of excavation would be required to uncover and remove the mine timbers.

After the mine timbers had been removed, the Contractor would backfill and regrade the trench created by the collapse and excavation of the adit. Approximately 90 cubic-yards of material would be required to backfill the resulting trench to specified grades. The material would be obtained by replacing the material excavated during adit demolition and by regrading the adjacent area. The areas around the adit, shaft and surface cut were to be blended to form a broad swale draining toward the road. Grades would not exceed 3H:1V. The longitudinal profile of the swale would make a smooth transition from the original ground elevation at the head of the disturbed area to the road elevation at the bottom. The regraded contours would blend smoothly with the surrounding terrain.

Probe Mine Openings - Prior to backfilling the adit, the end would be probed for a distance of 5 feet to determine if the adit was completely blocked. Probing the opening was to be accomplished by digging out a sufficient amount of the caved material to determine if the caved portion of the adit extended beyond this distance. Mine timbers and other debris that could be choking the adit were to be removed and hauled to the local landfill. If the adit was determined to be sufficiently caved, the excavation was to be backfilled as part of this operation. If the adit was reopened, an adit closure would be required.

Adit Closure - If the adit could be opened-up by probing, a 10-foot long backfill plug was to be installed inside the adit to seal the underground opening. The plug would provide complete blockage of the opening over the specified plug length. It was estimated that a plug would require 9 cubic-yards of backfill.

Fertilize, Seed, and Mulch - All areas disturbed (including roads and stockpile areas) were to be seeded, fertilized and mulched. The total area involved in the reclamation of these areas was estimated at 0.149 acres. Any areas that were seeded by the broadcast method would require an application rate of 48 pounds of pure live seed (PLS) per acre, which was twice the application rate for drill seeding. In addition, areas that were seeded by the broadcast method would either be tracked or raked after the seed had been applied. Fertilizer was to be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch would be applied at a rate of 3,000 pound per acre and anchored by crimping. Mulch would be "Montana Certified Weed Seed Free".

Straw Bales - The constructed swale would require straw bale erosion control measures. Approximately 5 bales would be required. Straw bales used for erosion control would be "Montana certified weed seed free". Installation of the straw bales would consist of two staggered rows across the full width of the swale. The straw bales would be embedded into the ground a minimum of six (6) inches. Bales would be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

Railroad Adit 1

Description - The Railroad Adit 1 was located in the SW¼NW¼ of Section 22, T3N, R8W and was situated adjacent to the county road which runs along the south side of Silver Bow Creek. It was located approximately 1.36 miles west of the Centennial Avenue turnoff. The site consisted of one (1) open adit. Hazard abatement at Railroad Adit 1 was to be achieved by digging-out the timber supports and then backfilling the resulting trench.

This 6-foot high by 4-foot wide adit was 69 feet in length and was heavily timbered for all but the last 14 feet. Square sets (posts, caps, and collar braces) were on 5 foot centers with 2-inch lagging on the sides and along the roof. The adit portal was situated at the end of a 22 foot long by 8 foot wide cut that began at the edge of the access road. From the end of the cut, the adit was driven into the hillside at approximately the road elevation. It followed a dog-leg path apparently going around two caved drifts which had created subsidence features on the surface adjacent to the adit. These features were 20' x 6' x 3' deep and 27' x 8' x 5½' deep. The first 30 feet of the adit had less than 4½ feet of loose cover above the roof. In this area, the adit roof was exposed in two small subsidence holes. The cover over the roof gradually increased to about 14 feet at the end of the adit. The cover material consisted of at least 6-inches of topsoil, sandy subsoils, and decayed granite to a depth of 8-10 feet. Near the end of the adit, the material directly above the roof was solid rock. A power line passed across the site with one power pole located 15 feet from the side of the adit.

Clear and Grub - In order to prepare the site for topsoil salvage, the area required for adit demolition and backfilling would be stripped of vegetation and other objectionable materials. The refuse resulting from this operation was to be hauled to the local landfill. It was estimated that 0.109 acre would be affected.

Salvage and Replace Topsoil - All recoverable cover soil would be stripped from the area which was to be disturbed by the adit demolition and backfilling operation. An estimated 85 cubic-yards of soil was to be salvaged, stockpiled, and later replaced on the regraded area. Cover soil was to be respread evenly over the regraded area and then brought to a friable condition suitable for seeding.

Adit Demolition and Backfilling - The first 52 feet of the adit was to be completely demolished by digging-out the timbers and lagging which provide support to the roof and walls. The adit excavation would begin at the portal where there was less than 1 foot of cover over the adit roof and extend into 11 feet of cover at the end. Since the adit was 6-feet high, the maximum depth of the excavation was to be around 17 feet. In areas where over 10-feet of backfill was to be replaced, it would not be necessary to remove 100-percent of the timbers from the excavation. However, any timbers left in the opening could not interfere with effective backfilling. Mine timbers and other debris removed from the adit were to be hauled to the local landfill.

After the mine timbers had been removed, the Contractor would backfill and regrade the subsidence features and the trench created by the collapse and excavation of the adit. The area was to be graded as a broad swale draining toward the road. Sideslopes along the swale would not exceed 3H:1V. The longitudinal profile of the swale would make a smooth transition from the original ground elevation at the head of the disturbed area to the road elevation at the bottom. It was anticipated that approximately 175 cubic-yards of excavation would be required to uncover and remove the mine timbers. Approximately the same volume would be required to backfill the resulting trench to the grades specified.

Adit Closure - At a distance of about 52-feet in from the portal, it was anticipated that adit demolition would be forced to stop because the remainder of the adit would be under solid rock. At this point, a 5-foot long backfill plug was to be installed inside the adit to seal the underground opening and to prevent subsidence. The plug would provide complete blockage of the opening over the specified plug length. It was estimated that this plug would require 11 cubic-yards of

backfill.

Fertilize, Seed, and Mulch - The total affected area including construction roads and stockpile areas (0.165 acres) would be graded then fertilized, seeded and mulched. Any areas seeded by the broadcast method would require an application rate of 48 pounds of pure live seed per acre, which was twice the application rate for drill seeding. In addition, areas that were seeded by the broadcast method would either be tracked or raked after the seed had been applied. Fertilizer was to be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch would be applied at a rate of 3,000 pound per acre and would be anchored by crimping. Mulch was to be "Montana Certified Weed Seed Free".

Straw Bales - All constructed swales would require straw bale erosion control measures. Approximately 7 bales would be required. Straw bales used for erosion control would be "Montana certified weed seed free". Installation of the straw bales would consist of two staggered rows across the full width of the swale. The straw bales would be embedded into the ground a minimum of six (6) inches. Bales would be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

Railroad Adit 2

Description - Railroad Adit 2 was located in the SW¼NW¼ of Section 22 in T3N, R8W and was situated adjacent to the county road which runs along the south side of Silver Bow Creek. It was located approximately 1.42 miles west of the Centennial Avenue turnoff. The site consisted of two (2) mine openings. The openings were a shallow adit with a caved drift and an open mine shaft which connected with the adit. Hazard abatement at Railroad Adit 2 was to be achieved by backfilling the shaft and by digging out and plugging the adit.

This 6-foot high by 4-foot wide adit extended 105 feet into the hillside to connect with a 24-foot deep shaft. It was supported by timber square sets (posts, caps, and collar braces) on 5 foot centers with 2-inch lagging on the sides and along the roof. The adit portal was situated 12 feet off the edge of the access road. For the first 23 feet the roof of the adit was exposed at the surface. Approximately 30 feet into the adit, a 15 foot long section of the roof had collapsed where there was 2-3 feet of cover over the roof. This collapse coincided with a caved drift on the west side of the adit. The subsidence hole associated with the drift was 11 feet in diameter and dropped to a depth of 10 feet. The drift was caved about 11 feet from the adit. The adit roof had caved to the surface a second time at 58 feet from the portal. This second caved area was 16 feet long and was in 6-10 feet of cover. The adit was blocked at this point but was probably open behind the cave. Cover over the roof gradually increased to about 18 feet where the adit connects with the shaft. The cover material consisted of topsoil, sandy subsoils, and decayed granite to a depth of at least 10 feet.

The shaft was lined with timbers from top to bottom and was 5' x 8'. In addition to the adit which connects from the north, a drift appeared to extend from the east side of the shaft. There was a small dump on the downhill edge of the shaft. A power line passed across the site between the adit portal and the shaft.

Bulkhead and Shaft Timber Removal - At the shaft, the surface bulkhead (6 planks nailed to the shaft collar) and the top 6 feet of shaft timbers and lagging which line the shaft would be removed. All debris from these operations would be collected and hauled to the local landfill. The shaft timbers would not be removed until the bottom 18-feet of the shaft had been backfilled.

Backfill Mine Openings - The shaft was to be backfilled with the fill material mounded 1½-feet above the current collar elevation. The backfill crown would be graded to drain in all directions and would not have greater than 3H:1V slopes. The bottom 18-feet of the shaft was to be backfilled

before attempting to remove the top 6-feet of shaft timbers and lagging. It was estimated that this opening would require 56 cubic-yards of backfill. The adjacent dump would supply 16 cubic-yards. The remaining 40 cubic-yards were to be borrowed from the surface cut at the Atomic Site. The borrow source was located 400 feet to the west and was adjacent to the road. The borrow area was to be reclaimed as part of the Atomic Site. Topsoil salvage from the access route was not anticipated.

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area would be stripped of vegetation and other objectionable materials. The refuse resulting from this operation would be hauled to the local landfill. It was estimated that 0.111 acres were to be affected at the site.

Salvage and Replace Topsoil - All recoverable cover soil would be stripped from the area which was to be disturbed by adit demolition and backfilling. It was estimated that 90 cubic-yards of soil would be salvaged in the disturbance area. This cover soil would be stockpiled and later replaced on the regraded areas. Cover soil was to be respread evenly and brought to a friable condition ready for seeding.

Adit Demolition and Backfilling - The first 85 feet of the adit and 13 feet of drift were to be completely demolished by digging-out the timbers and lagging which provided support to the roof and walls. The adit excavation would begin at the portal where the adit roof was above the surface and extend into about 13 feet of cover at the end. Since the adit was 6-feet high, the maximum depth of the excavation would be around 19 feet. Mine timbers and other debris removed from the adit were to be hauled to the local landfill. Because this adit continues underground beyond the point specified for demolition, the Contractor would be required to install a plug in the open adit before completing the backfilling operation.

After the mine timbers had been removed, the Contractor would backfill and regrade the trench created by the collapse and excavation of the adit and drift. The backfilled area was to be graded as a broad swale draining toward the road and was to be contoured to blend with the adjacent terrain. Sideslopes along swales would not exceed 3H:1V. The longitudinal profile of each swale would make a smooth transition from the regraded contours at the head of the disturbed area to the road elevation at the bottom. It was anticipated that approximately 320 cubic-yards of excavation would be required to uncover and remove the mine timbers. Approximately the same volume would to be required to backfill the resulting trench.

Adit Closure - At a distance of approximately 85-feet in from the portal, adit demolition would be stopped. At this point, a 5-foot long backfill plug would be installed inside the adit to seal the underground opening and to prevent subsidence. The plug would provide complete blockage of the opening over the specified plug length. It was estimated that this plug would require 11 cubic-yards of backfill.

Fertilize, Seed, and Mulch - The total affected area including construction roads and stockpile areas (0.280 acres) would be graded then fertilized, seeded and mulched. Any areas that might be seeded by the broadcast method would require an application rate of 48 pounds of pure live seed per acre, which was twice the application rate for drill seeding. In addition, any areas seeded by the broadcast method would either be tracked or raked after the seed had been applied. Fertilizer was to be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch would be applied at a rate of 3,000 pound per acre and would be anchored by crimping. Mulch would be "Montana Certified Weed Seed Free".

Straw Bales - All constructed swales would require straw bale erosion control measures. Approximately 7 bales were to be required. Straw bales used for erosion control would be "Montana certified weed seed free". Installation of the straw bales would consist of two staggered rows across the full width of the swale. The straw bales would be embedded into the ground a minimum of six (6) inches. Bales would be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

Rising Sun

Description - The Rising Sun Site was located in the SW¼NW¼ of Section 22, T3N, R8W and was situated 800 feet south of the Atomic Site. The site can be reach by driving approximately 1.6 mile west on the county road from the Centennial Avenue turnoff to the Atomic Site. Then leave the established road and travel approximately 600 feet up the slope to the Carrie Dump which is situated in the middle of the draw which runs past the east side of the Atomic Site. From the Carrie Dump continue uphill in a southwesterly direction another 300 feet to the Rising Sun. The site consisted of an open shaft and an adjacent dump. Hazard abatement at the Rising Sun Site was to be achieved by completely backfilling the shaft.

The Rising Sun shaft was 11 feet deep and had a diameter of 16 feet at the surface tapering to a diameter of around 10 feet at the bottom. A small dump extended downhill on the north side of the shaft covering a 17' x 15' area to an average depth of 2 feet.

Backfill Mine Openings - The Rising Sun Shaft was to be backfilled with approximately 55 cubic-yards of material which could be excavated from the adjacent dump and from the surrounding area. The Contractor would grade the disturbed area to blend with the surrounding contours using maximum 3H:1V slopes.

Seed and Fertilize - The disturbed areas at the Rising Sun Site would be seeded and fertilized. Due to the limited access requirements, access route reclamation was not anticipated. Approximately 0.06 acres would need to be reseeded. Broadcast seeding would be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer would be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area was to be tracked.

Storm King Site

Description - Storm King Site was in the SE¼NW¼ of Section 22 in T3N, R8W and was situated adjacent to the county road which runs along the south side of Silver Bow Creek. The openings were located along the stretch of road that begins 1.15 miles west of the Centennial Avenue turnoff and ends approximately 250 feet further west. The site consisted of six (6) mine openings. The openings included a partially collapsed shaft, two shallow prospect pits, two partially caved adits, and a completely caved adit. Hazard abatement at the Storm King Site was to be achieved by backfilling the shaft and pits and by digging out and plugging the adits.

Adit #1 was a 6-foot high by 4-foot wide adit that extended 100 feet into the hillside to a point where the roof was caved completely blocking the adit. The adit was straight and level for 77 feet then it turned and headed directly for the Storm King Shaft #1. The shaft was only 15 feet from where the adit was blocked and had also caved . Adit #1 was supported by timber square sets (posts, caps, and collar braces) on 5 foot centers with 2-inch lagging on the sides and along the roof. The adit portal was situated 17 feet off the edge of the access road. For the first 57 feet the roof of the adit was exposed at the surface. In this area the surface had been cut and graded around the adit leaving a 7 foot high cut slope where the adit roof disappears underground. Cover over the roof gradually increased to about 15 feet at the point where the adit was blocked. Any dump material that might have been associated with this opening was probably used when the county road was constructed.

The Storm King Shaft #1 was lined with timbers and was 4' x 10'. It had collapsed and was completely choked 10 feet below the collar. A subsidence feature which was probably associated with the roof failure in Adit #1 had broken to the surface near the edge of the shaft causing the shaft collar to slump in this area. The subsidence feature was a funnel-shaped hole extending to a depth of 7 feet. The shaft was located in an 20' x 24' area that had been leveled leaving a 5 foot high cut slope on the uphill side. The remains of a surface bulkhead constructed of timbers and

planks partially covered the shaft. A dump with about 45 cubic-yards of waste was on the downhill edge of the shaft. A power line passed across the site between the adit portal and the shaft.

The Storm King Pits #1 and #2 were located respectively 23 feet and 32 feet west of Shaft #1 and at approximately the same elevation. The material excavated from these opening was in small dumps on the downhill edge of the pits. Pit #1 was 5½ feet deep. It had a top diameter of 14 feet which tapered down to a 4' x 5' bottom. Pit #2 was 5 feet deep. It had a top diameter of 16 feet which tapered down to a 8' x 3' bottom.

Adit #2 was located 230 feet east of Adit #1. Its portal was situated 17 feet off the south side of the access road. It was 4' wide by 6' high and was caved and completely blocked 55 feet in from the portal. For the first 28 feet the roof of the adit was exposed at the surface. At this point the hillside began to gradually slope upward at 5H:1V. From 28-34 feet into the adit, the roof was caved to the surface producing a small subsidence feature. The roof was supported for a short distance behind the initial cave; but, from 39-55 feet into the adit a 16 foot long section of the roof had collapsed producing a subsidence hole. The subsidence occurred where there was 4-9 feet of cover over the roof. At the surface, the subsidence hole was up to 15 feet wide. The adit was supported with timber square sets (posts, caps, and collar braces) on 4 foot centers with 2-inch lagging on the sides and along the roof. Since the dump would have been at the level of the access road, any dump material would have been used in road construction.

Adit #3 was located 60 feet west of Adit #2. It was situated a few feet off the south side of the access road. It appeared to have completely caved producing a 30 foot long subsidence trench. The trench was about 9 feet wide at the surface and around a foot wide at the bottom. It averaged 4 feet in depth. Many of the timbers and posts that were used to support the adit stuck up through the rubble. A dump was not associated with this caved opening.

Bulkhead and Shaft Timber Removal - At Shaft #1, the Contractor would remove what remained of the surface bulkhead and the top 10 feet of timbers and wood planks lining the shaft. All debris from these operations would be collected and hauled to the local landfill.

Backfill Mine Openings - Pits #1 and #2 were to be backfilled to the surface with material from the adjacent mine dumps. It was estimated that these openings would require 40 cubic-yards of backfill. The area disturbed by construction was to be regraded to blend with the surrounding contours. Areas on the dumps which would be disturbed by borrow excavation were to be regraded with maximum 2½H:1V slopes.

Shaft #1, the subsidence feature, and the associated surface cut were to be backfilled with material from the adjacent dump. Backfilling the shaft and adjacent subsidence feature would take approximately 30 cubic-yards unless the shaft could be reopened by probing. The backfilled areas would be regraded with slopes not exceeding 2½H:1V except where required to blend with the surrounding contours.

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area would be stripped of vegetation and other objectionable materials. The refuse resulting from this operation would be hauled to the local landfill. It was estimated that 0.223 acres would be affected at the site.

Salvage and Replace Topsoil - All recoverable cover soil would be stripped from the area which was to be disturbed by adit demolition and backfilling. It was estimated that 90 cubic-yards of soil would be salvaged in the disturbance area around **Adit 1**; that 60 cubic-yards of soil would be salvaged around **Adit 2**; and that 25 cubic-yards of soil would be salvaged at **Adit 3**. This cover soil would be stockpiled and later replaced on the regraded areas. Cover soil was to be respread evenly and brought to a friable condition ready for seeding.

Adit Demolition and Backfilling - Adits 1, 2, and 3 were to be completely demolished by digging-out the timbers and lagging which provide support to the roof and walls. In areas where the backfill

depth was at least 10-feet above the adit floor, it would not be necessary to remove 100-percent of the timbers from the excavation. However, any timbers left in the opening could not interfere with effective backfilling. Mine timbers and other debris removed from the adit were to be hauled to the local landfill. After the mine timbers had been removed, the Contractor would backfill and regrade the trenches created by the collapse and excavation of the adits. Backfilled areas were to be graded as broad swales draining toward the road and were to be contoured to blend with adjacent terrain. Sideslopes along the swales would not exceed 3H:1V. The longitudinal profile of each swale would make a smooth transition from the regraded contours at the head of the disturbed area to the road elevation at the bottom.

The first 100 feet of the **Adit 1** was to be completely demolished. The adit excavation would begin at the portal where the adit roof was near the surface and extend back to where the adit was caved and blocked under 15 feet of cover. Since the adit was 6-feet high, the maximum depth of the excavation would be around 21 feet. Regraded contours would blend with the adjacent terrain and with the backfilled area at Shaft #1. It was anticipated that approximately 450 cubic-yards of excavation would be required to uncover and remove the mine timbers. Approximately the same volume would be required to backfill the resulting trench to the specified grades.

The first 55 feet of the **Adit 2** was to be completely demolished. The adit excavation would begin at the portal where the adit roof was near the surface and extend back to where the adit was caved under 8 feet of cover. Since the adit was 6-feet high, the maximum depth of the excavation were to be around 14 feet. Because this adit could continue underground beyond the point where it was caved and blocked, the Contractor would be required to probe for an opening and install a plug if an opening was found. It was anticipated that approximately 100 cubic-yards of excavation would be required to uncover and remove the mine timbers. Approximately the same volume would be required to backfill the resulting trench.

The Contractor would be required to dig-out the timbers and lagging exposed in the 24-foot long collapsed portion of **Adit 3**. The maximum depth of the excavation would be around 10 feet. It was anticipated that approximately 20 cubic-yards of excavation would be required to remove the mine timbers. Approximately the same volume would be required to backfill the resulting trench to the grades specified. Because this adit could continue underground beyond the point where it was caved and blocked, the Contractor would be required to probe for an opening and install a plug if an opening was found.

Probe Mine Openings - Prior to backfilling Adit 2 and Adit 3, these openings were to be probed. Adit 2 and Adit 3 were to be probed for a distance of 5 feet from the point where the adits had been found to be caved and blocked. Probing the opening was to be accomplished by digging out a sufficient amount of the caved material to determine if the caved portion of the adit extended beyond this distance. Mine timbers and other debris that could be choking the adits were to be removed and hauled to the local landfill. If the adit was determined to be sufficiently caved, the excavation would be backfilled as part of this operation. If the adit could be reopened, an adit closure would be required.

Prior to backfilling Shaft #1, this opening would be probed. Shaft #1 was to be probed to a depth of 16 feet below the collar. Probing the opening would be accomplished by digging out the material which has caved or otherwise collected in the underground opening. Mine timbers and other debris that could be removed from the shaft would be hauled to the local landfill. A backhoe or excavator with a long reach and a 1-2 yard bucket would be well suited for this operation.

Adit Closure - If Adit 2 or Adit 3 could be opened-up by probing, 10-foot long backfill plugs were to be installed inside these adits to seal the underground openings. The plugs would provide complete blockage of the openings over the specified plug length. It was estimated that a plug for **Adit 2** would require 12 cubic-yards of backfill and that a plug for **Adit 3** would require 8 cubic-yards of backfill.

Seed and Fertilize - The affected areas associated with Pits #1 and Pit #2 and the Shaft 1 backfill

area were to be seeded and fertilized by broadcast methods. It was estimated that 0.04 acres would be reseeded. Broadcast seeding was to be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer was to be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. It was estimated that 1.9 pounds of Pure-Live-Seed and 3.7 pounds of fertilizer would be required. After application, the reseeded area would be tracked.

Fertilize, Seed, and Mulch - All areas disturbed (including roads and stockpile areas) at Adit 1, Adit 2, and Adit 3 were to be seeded, fertilized and mulched. The total area involved in the reclamation of these areas was estimated at 0.313 acres. Any areas that were seeded by the broadcast method would require an application rate of 48 pounds of pure live seed (PLS) per acre, which was twice the application rate for drill seeding. In addition, areas seeded by the broadcast method would either be tracked or raked after the seed had been applied. Fertilizer was to be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch would be applied at a rate of 3,000 pound per acre and would be anchored by crimping. Mulch was to be "Montana Certified Weed Seed Free".

Straw Bales - All constructed swales would require straw bale erosion control measures. Approximately 13 bales would be required. Straw bales used for erosion control would be "Montana certified weed seed free". Installation of the straw bales would consist of two staggered rows across the full width of the swale. The straw bales would be embedded into the ground a minimum of six (6) inches. Bales would be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

4.1.3 Group 3 Site - Walkerville

The Group 3 site was located in Sections 1 of T3N, R8W. This area can be reached by driving north on Main Street.

Silversmith Site

Description - The Silversmith Site consisted of a culturally significant headframe which had been toppled. The 17 foot high headframe was of timber construction. The Silversmith Shaft was originally a single-compartment 5' x 5' timber-lined shaft that reached a depth of 60 feet. The shaft had caved around the collar filling it to a depth of 31 feet and creating an 8' x 10' opening near the top. The site was located at the end of Main Street. The shaft collar was 50 feet off the side of the street and was approximately 10 feet higher in elevation.

Bulkhead and Shaft Timber Removal - The Contractor would remove what remains of the surface bulkhead and the top 15 feet of timbers and wood planks lining the shaft. All debris from these operations would be collected and hauled to the local landfill. The shaft timbers would not be removed until the shaft had been backfilled to within 15-feet of the surface. It was estimated that these operations would generate approximately 20 cubic-yards of debris.

Backfill Mine Openings - The shaft was to be backfilled to the surface using material from the adjacent dump. Backfilling the shaft would take approximately 70 cubic-yards. The Contractor would use appropriate means to compact the fill. Borrow areas were to be regraded with slopes not exceeding 2½H:1V except where required to blend with the surrounding contours.

Headframe Protection - The Silversmith headframe was to be moved just far enough to allow shaft backfilling activities.

4.1.4 Bluebird Trail

The Bluebird Trail was a proposed scenic walking and bicycle tour which would follow a portion of the old Butte to Rocker Road. This project was being planned by Butte-Silver Bow.

Bluebird Trail Grading - Grading would consist of blading and shaping the roadbed which was approximately 12-15 feet wide to remove ruts, washes, sloughs, and other irregularities that prevent normal runoff from the road surface. Shallow ruts, chuckholes, and washes were to be removed by scarifying or cutting to the bottom of such defects. Deep ruts, chuckholes, and washes were to be removed by filling and compacting to the extent possible under the existing conditions. The road was to be graded with a uniform inslope or outslope across the entire width of the road to provide drainage. Existing drainage dips were to be reshaped. At the conclusion of the grading and shaping operation, the roadbed was to be dressed to produce to a smooth grade and cross-section.

The section of road to be graded was to be staked in the field. A concrete barrier and gate system were to be installed at each end of the trail. Grading would be limited to the section between these two gates. Fill material for repairing large ruts and depressions and for surfacing was to be supplied by Butte-Silver Bow and was to be stockpiled on site.

Bluebird Trail Concrete Barrier and Gate Installation - Two concrete barrier and gate systems were to be installed. A barrier and gate system were to be installed at each end of the Bluebird Trail.

4.2 Major Equipment List

Type	Make/Model	Size/Horsepower	No. on Job
Scraper	Michigan 110-11B	11 yd/ 174 Hp	1
Track Loader	John Deere 755	2¼ yd/ 152 Hp	1
Grader	Caterpillar 12E	115 Hp	1
Excavator (Hollow)	John Deere 792	1½ yd/ 200 Hp	1
Backhoe/Loader	Case 580	7/8 yd/ 55 Hp	1
Dump Truck	1964 Ford	6 yd	1
Crane (Hollow)	Grove	50 Tons	1
Crimper	Home made		1

4.3 Contractor Employees

Ed and Willie Baxter, co-owners of Baxter Construction, were the only personnel directly employed by Baxter Construction to work on the project. Baxter used Hollow Construction of Butte for all hydraulic excavator work, for work requiring a crane, and for construction of the Tri-Deck shaft closure footings. Hollow supplied the excavator with one operator, the crane with one operator, and two cement masons for footer layout and construction.

4.4 Construction Activities

4.4.1 Apex Site

Backfill Mine Openings - On October 10-11, 1995, the Apex #1 inclined shaft, trench and four pits were backfilled using material from the dump located less than 100 feet away. All backfill surfaces were graded to blend with the surrounding contours. Borrow areas on the dump were regraded with maximum 2H:1V slopes. On October 11, 1995, the Apex #2 shaft was backfilled using material from its associated dump and from the adjacent area. The entire dump was removed in this operation. The area disturbed by construction was regraded with a mound over the backfilled area. Baxter used his JD 755 track loader to complete this work.

Seed and Fertilize - On October 17, 1995, 0.12 acre of construction disturbance was seeded and fertilized by the broadcast method. The specified seed mixture and application rate of 48 pounds of Pure-Live-Seed per acre were utilized. The specified fertilizer mixture and application rate of 92.5 pounds of nutrients per acre were used.

4.4.2 Great Republic Site

Backfill Mine Openings - On October 5, 1995, the JD 755 track loader was used to backfill the openings at the Great Republic #3 and #4. The Great Republic #3 cut and adit were backfilled by borrowing material from the south side of the cut and recontouring the area to blend with the surrounding contours. Material borrowed from the top of the dump associated with the Great Republic #2 was also used for backfill. The incline at the Great Republic #4 was probed before being backfilled. The surface excavation associated with the incline was then be filled and graded as a broad swale. Slopes on the backfill area were 3H:1V or less. Material was borrowed from the adjacent dump and from the sides of the cut.

On October 10, 1995, the Great Republic #5 shaft was backfilled by removing the entire dump and then borrowing additional material from the area below the opening. The backfill was slightly mounded over the opening. The area disturbed by construction was regraded to blend with the surrounding contours. The JD 792 excavator was used.

On October 11, 1995, the JD 792 excavator was used to backfill the Great Republic #2 shaft with material borrowed from the nearby dump. Backfill was mounded approximately 3-feet high over the opening. The shaft was probed prior to backfilling. Areas on the dump which were disturbed by borrow excavation were regraded with maximum 2H:1V slopes.

Probe Mine Openings - On October 11, 1995, the Great Republic #2 shaft was probed to a depth of 20 feet below the collar using the JD 792 excavator. Baxter also probed the incline at the Great Republic #4 prior to backfilling this opening. This opening was probed with the JD 755 track loader on October 5, 1992.

Debris Cleanup - On October 10,1995, the debris in the Great Republic #5 shaft was removed by the JD 792 excavator. This debris was hauled to the local landfill.

Seed and Fertilize - The 0.295 acres disturbed by construction at the Great Republic #2, #3, #4, and #5 were seeded and fertilized by the broadcast method on October 17, 1995. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized.

4.4.3 Nemo South Site

Debris Cleanup and Probing - On October 11, 1995, trash in the bottom of the subsidence cone was removed and hauled to the county landfill. The shaft was then probed using the JD 792 excavator.

Backfill Mine Openings - On October 6, 1995, Baxter moved his JD 755 track-loader onto the site and began backfilling and grading the various pits and depressions. After working part of one day, Baxter decided to move off the site until he could rent a hydraulic excavator. On October 11, 1995, a JD 792 excavator from Hollow Construction was brought in to probe and backfill the shaft. On October 13, 1995, Baxter again used his JD 755 track-loader to complete the backfilling and to mound 10 feet of material over the shaft. In addition to the caved shaft, the seven (7) specified pits or depressions on the site were backfilled to the surface using material from the adjacent or nearby dumps. All areas disturbed by construction were regraded to blend with the surrounding contours. Disturbance to the large dump on the east side of the road was limited to approximately 50 cubic-yards of excavation which was required for relocation of the road. All other dumps were either totally or partially consumed as borrow sources.

Road Relocation - On October 13, 1995, Baxter used his track-loader to reroute the access road between the large mound which had been constructed over the caved shaft and dump on the east side of the road. Approximately 150-feet of this road was relocated.

Seed and Fertilize - All disturbed areas except the running surface on the road were seeded and fertilized. The 0.350 acres disturbed by construction were seeded and fertilized by the broadcast method on October 17, 1995. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized.

4.4.4 Nettie Main Site

Backfill Mine Openings - On October 17-19, 1995, Baxter used his track-loader and an old Michigan 110-11 scraper to backfill the depression left by the caved shaft. The east side of the Hibernia dump was used as a borrow source. The backfill over the caved shaft was mounded 10-feet above the dump elevation on the southeast side of the shaft and about 1-feet above the existing ground elevation of the bench on the northwest side of the shaft. Approximately 1600 cubic-yards of backfill was used. All backfill surfaces were graded to blend with the surrounding contours using slopes not exceeding 3H:1V. The borrow area was regraded with maximum 3H:1V slopes.

Seed and Fertilize - Borrow area seeding was not required. However, on October 19, 1995, the backfill area which contained approximately 0.225 acres was seeded and fertilized by the broadcast method. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized. The reseeded area was tracked.

4.4.5 Nettie Incline Site

Backfill Mine Openings - On October 4-5, 1995, the subsidence depression associated with the caved Nettie Incline was backfilled using material from the adjacent dump. The backfill was mounded over the opening to provide positive drainage in all directions. The depression and mound required 1400 cubic-yards of backfill. All disturbed surfaces were graded to blend with the surrounding contours.

Seed and Fertilize - The 0.300 acres disturbed by construction were seeded and fertilized by the broadcast method on October 17, 1995. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized.

4.4.6 Olson Fraction Site

Structure Removal - The structure at the Olson Fraction #1 was completely dismantled and removed from the site on October 5, 1995. The dismantled structure was hauled to the local landfill.

Backfill Mine Openings - On October 5, 1995, the Olson Fraction #1 opening was backfilled with material from the adjacent mine dump and the area disturbed by construction was regraded to blend with the surrounding contours. The entire dump on the downhill side of the opening was consumed in this operation.

On the same day, the Olson Fraction #2 shaft was backfilled to the surface with 35 cubic-yards of material from the adjacent mine dump. The entire dump was not consumed in this operation; so, a portion of it was regraded in-place.

Seed and Fertilize - The 0.045 acre disturbed by construction was seeded and fertilized by the broadcast method on October 17, 1995. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized.

4.4.7 Plutus Site

Bulkhead and Shaft Timber Removal - On October 10, 1995, the 16' x 17' surface bulkhead on the Plutus shaft was uncovered, dismantled. The shaft was choked to the surface with fill material immediately after the bulkhead was removed. Debris from the bulkhead removal was removed from the site and hauled to the landfill of October 18, 1995. Those bulkhead components salvaged by the Contractor were removed from the site on October 28, 1995.

Backfill Mine Opening - On October 10, 1995, the open portion of the Plutus shaft which extended from the collar down to 33-feet below the surface was backfilled with material excavated from the dump lobes located on the northeast side of the shaft. Then the area around the shaft was leveled in preparation for the Tri-Deck beam shaft closure. Baxter employed his track-loader and the rented hydraulic excavator for this operation. Baxter completed the grading and contouring of the impacted portion of the dump on October 13, 1995.

Tri-Deck Beam Shaft Closure - From October 10th through November 9th, 1995, the Contractor completed various tasks necessary to install a 31' x 36' shaft cover over the Plutus shaft using 6 prestressed Tri-Deck concrete beams conforming with AASHTO HS20 loading (intermediate bridge sections).

(1) A 32 ft x 36 ft area surrounding the shaft was leveled on October 10-13, 1995.

(2) On October 16, 1995, Baxter used his 12E motor grader to improve the access roads to the site.

(3) On October 18, 1995, the Contractor excavated for footings and installed forms for a 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1½".

(4) On October 18, 1995, the reinforced concrete footers to level and support the Tri-Deck Beams were poured using 7.8 cubic-yards of 3000 PSI concrete. Longitudinal reinforcement consisted of 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Longitudinal reinforcement bars were bent around the corners.

(5) The forms were removed on October 19, 1995.

Six Tri-Deck Beams (each beam was 31 feet in length, 1' 4" in depth, approximately 6 feet wide, and weighed approximately 21,000 pounds) were fabricated by Elk River Concrete Products at its Montana Prestress facility in Billings, Montana. The beams were shipped to the site via HiBall Trucking on October 31, 1995. Each truck carried two beams. During the delivery, the last truck took a corner too sharply on one of the dirt roads leading to the site and dumped both beams off the trailer. One of the beams sustained a longitudinal crack. After consulting with the project engineer, Baxter reloaded the beams on the trailer and subsequently accepted conditional delivery contingent on the manufacturer's inspection and repair of the damage. All six beams were set in-place on the footer around the Plutus Shaft immediately upon delivery. Baxter utilized a large crane rented from Holland Construction to lift and place the beams edge to edge on the concrete footers.

On November 8, 1995, Baxter fastened the beams in-place by bolting fastener onto the outside legs of each beam and then welding the fasteners to plates which had been imbedded in the footer. Precast endwalls were installed at the ends of each beam on November 9, 1995.

On November 9, 1995, the closure was completed by filling around the edge of the closure and then grading the fill to slope down from the top of the closure at a 4H:1V slope. Baxter used his backhoe/loader for the grading.

Seed and Fertilize - The 0.460 acre disturbed by construction was seeded and fertilized by the broadcast method on November 9, 1995. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized.

Beam Repair - On November 15th, 1995, Elk River Concrete Products repaired the cracked beam using an epoxy cement.

4.4.8 Prospector Site

Bulkhead and Shaft Timber Removal - On October 10, 1995, Baxter used the JD 792 hydraulic-excavator to uncover the Prospector shaft and to remove two bulkheads in the shaft. The mound of dirt over the first bulkhead and the planks making up the first bulkhead were removed as planned. However, when Baxter attempted to remove the second bulkhead which was located 16 feet below the collar, the excavator bucket could not maneuver in the 12' x 7' shaft. So, the timbers at the top of the shaft were removed to provide the required room. As this bulkhead was being removed, it was discovered that the shaft was flooded to a level only several feet below this bulkhead. All debris from these operations was piled on site and subsequently hauled to the local landfill on October 19, 1995.

Backfill Mine Opening - Immediately after removing the bulkheads in the Prospector shaft on October 10th, Baxter started to use the JD 792 excavator to backfill the top section of the shaft as planned. However, the shaft was not blocked approximately 39-feet below the surface as had been anticipated. Instead of taking 120 cubic-yards of material from the adjacent dump to choke the shaft to the surface, it took 1180 cubic-yards. Before this operation was completed, Baxter had to use his track-loader to push material to the excavator. This significantly expanded the borrow area on the dump and allowed the disturbed area on the dump to be regraded with slopes shallower than 5H:1V .

Dump Excavation - Due to the expanded backfill requirements, additional dump excavation was not required.

Tri-Deck Beam Shaft Closure - From October 10th through November 9th, 1995, the Contractor completed various tasks necessary to install a 31' x 36' shaft cover over the Prospector shaft using 6 prestressed Tri-Deck concrete beams conforming with AASHTO HS20 loading (intermediate bridge sections).

(1) A 32 ft x 36 ft area surrounding the shaft was leveled on October 10, 1995.

(2) On October 10, 1995, the Contractor excavated for footings.

(3) On October 11, 1995, the network of reinforcing iron for the concrete footers was built. Longitudinal reinforcement used 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Longitudinal reinforcement bars were bent around the corners.

(4) Forms for the 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1½" were installed on October 16, 1995.

(5) On October 17, 1995, the reinforced concrete footers to level and support the Tri-Deck Beams were poured using 7.8 cubic-yards of 3000 PSI concrete.

(6) The forms were removed on October 18, 1995.

Six Tri-Deck Beams (each beam was 31 feet in length, 1' 4" in depth, approximately 6 feet wide, and weighed approximately 21,000 pounds) were fabricated by Elk River Concrete Products at its Montana Prestress facility in Billings, Montana. The beams were shipped to the site via HiBall Trucking on October 30, 1995. Each truck carried two beams. Upon delivery, a large crane rented from Holland Construction set all six beams on the footer around the Prospector shaft. On October 31, 1995, Baxter utilized the crane to lift and place the beams edge to edge on the concrete footers.

On November 7, 1995, Baxter fastened the beams in-place by bolting fasteners onto the outside legs of each beam and then welding the fasteners to plates which had been imbedded in the footer. Precast endwalls were installed at the ends of each beam on the same day.

On November 9, 1995, the closure was completed by filling around the edge of the closure and then grading the fill to slope down from the top of the closure at a 4H:1V slope. Baxter used his backhoe/loader for the grading.

Seed and Fertilize - On November 9, 1995, 0.250 acre of construction disturbance on the excavated portion of the dump and around the shaft closure was seeded and fertilized by the broadcast method. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized.

4.4.9 Atomic Site

Structure Removal - The headframe at the Atomic was completely dismantled on October 12, 1995. The wood debris was either hauled to the landfill or salvaged for fire wood and removed from the site on October 27, 1995.

Bulkhead and Shaft Timber Removal - On October 12, 1995, the surface deck (approx. 8' x 10') and the top 13 feet of timbers and wood planks lining the shaft were removed from the shaft. All debris from these operations was removed on October 27, 1995.

Debris Cleanup - Debris (approx. 8 CY) in the cut below the shaft was loaded into a dump truck and hauled to the county landfill on October 27, 1995.

Clear and Grub - Prior to topsoil salvage, the construction area was cleared and grubbed.

Salvage and Replace Topsoil - On October 12, 1995, all recoverable topsoil was stripped from

the area which was to be disturbed by site grading and backfilling. This material was stockpiled, and later replaced on the regraded area immediately after regrading the site.

Backfill Mine Openings - On October 12, 1995, the JD 792 excavator was used to eliminate the shaft by a combination of regrading and backfilling. The surface cut between the road and the shaft was also recontoured during this operation. Fill required to raise the floor of the surface cut up to the elevation of the adjacent section of county road was primarily obtained by reducing the walls around the cut. The Contractor decided not to use the surface cut as a borrow source for the Railroad Adit 2 Site.

Adit Demolition and Backfilling - On October 12, 1995, the JD 792 excavator was used to completely demolish the first 56 feet of the adit by digging-out the adit timbers and lagging. Nearly all of the timbers were removed from the excavated area. After the mine timbers had been removed, the collapsed and excavated area along the adit was backfilled and recontoured. The wood debris was removed from the site on October 27, 1995.

Probe Mine Openings - On October 12, 1995, the caved adit was probed for 10 feet beyond the distance specified for adit demolition. The hydraulic excavator was used in this operation. The adit was caved throughout this area.

Adit Closure - Because the adit could not be opened by probing, the adit closure specified for this site was not required.

Fertilize, Seed, and Mulch - On October 27, 1995, fertilizer was spread on the disturbed area. On November 8, 1995, 0.150 acre of construction disturbance was seeded by the broadcast method. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized. On the same day the area was seeded, 3,000 pound per acre of straw mulch was applied and crimped. The mulch was "Montana Certified Weed Seed Free".

Straw Bales - Erosion control measures at the bottom of the regraded area consisted of 5 bales of "Montana certified weed seed free" straw. The bales were anchored to the ground on November 8, 1995.

4.4.10 Railroad Adit 1 Site

Clear and Grub - Where required clearing and grubbing was accomplished ahead of cover soil stripping.

Salvage and Replace Topsoil - On October 11, 1995, cover soil was stripped from the area which was to be disturbed by the adit demolition and backfilling operations. The soil was stockpiled and replaced on the regraded area on October 20, 1995.

Adit Demolition and Backfilling - On October 11, 1995, the JD 792 excavator was used to completely demolish the first 55 feet of the adit by digging-out the adit timbers and lagging. Nearly all of the timbers were removed from the excavated area. The adit excavation began at the portal and extended into 11 feet of cover at the end. This left about 14 feet of adit under a roof which was too hard to dig. After the mine timbers had been removed, a substantial plug was placed the open section of adit. Then the collapsed and excavated area along the adit was backfilled. The wood debris was removed from the site on October 27, 1995.

On October 20, 1995, the JD 755 track-loader was used to grade the disturbed areas as a broad swale draining toward the road. Slopes did not exceed 3H:1V.

Adit Closure - At a distance of about 55-feet in from the portal, a 5-foot long backfill plug was installed inside the adit to seal the underground opening and to prevent subsidence. The plug was installed on October 11, 1995.

Fertilize, Seed, and Mulch - On October 27, 1995, fertilizer was spread on the disturbed area. On November 8, 1995, 0.170 acre of construction disturbance was seeded by the broadcast method. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized. On the same day the area was seeded, 3,000 pound per acre of straw mulch was applied and crimped. The mulch was "Montana Certified Weed Seed Free".

Straw Bales - Erosion control measures at the bottom of the regraded area consisted of 7 bales of "Montana certified weed seed free" straw. The bales were anchored to the ground on November 8, 1995.

4.4.11 Railroad Adit 2 Site

Bulkhead and Shaft Timber Removal - The surface bulkhead (6 planks nailed to the shaft collar) and the top 10 feet of shaft timbers and lagging which lined the shaft were removed on October 11, 1995. The wood debris was either hauled to the landfill or salvaged for fire wood and removed from the site on October 27, 1995. The shaft timbers were not removed until the shaft had been backfilled to within 10 feet of the surface.

Backfill Mine Openings - On October 11, 1995, the shaft was backfilled with the fill material mounded 1½-feet above the collar elevation. The backfill crown was graded to drain in all directions. The bottom section of the shaft was backfilled before the top 10-feet of shaft timbers and lagging were removed. The 56 cubic-yards of backfill required to fill the shaft was obtained by removing the entire dump and by borrowing from the adjacent area. The Atomic Site was not required as a borrow source.

Clear and Grub - Where required clearing and grubbing was accomplished ahead of cover soil stripping.

Salvage and Replace Topsoil - On October 11, 1995, the recoverable cover soil was stripped from the area which was to be disturbed by other construction operations. The soil was stockpiled and replaced on the regraded areas on October 27, 1995. Only a small quantity of soil was recovered at this site.

Adit Demolition and Backfilling - On October 12, 1995, the JD 792 excavator was used to completely demolish the first 74 feet of the adit and 13 feet of drift by digging-out the adit timbers and lagging. Nearly all of the timbers were removed from the excavated area. The adit excavation began at the portal and extended into 13 feet of cover at the end. This left about 29 feet of adit still intact but under a roof which was too hard to dig. After the mine timbers had been removed, a substantial plug was placed in the open section of adit. Then the collapsed and excavated areas along the adit and drift were backfilled. The wood debris was removed from the site on October 27, 1995.

On October 27, 1995, the JD 755 track-loader was used to grade the disturbed areas as a broad swale draining toward the road. Slopes did not exceed 3H:1V.

Adit Closure - At a distance of about 74-feet in from the portal, a 5-foot long backfill plug was installed inside the adit to seal the underground opening and to prevent subsidence. The plug was installed on October 12, 1995.

Fertilize, Seed, and Mulch - On October 27, 1995, fertilizer was spread on the disturbed area. On November 8, 1995, 0.210 acre of construction disturbance was seeded by the broadcast method. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized. On the same day the area was seeded, 3,000 pound per acre of straw mulch was applied and crimped. The mulch was "Montana Certified Weed Seed Free".

Straw Bales - Erosion control measures at the bottom of the regraded area consisted of 7 bales of "Montana certified weed seed free" straw. The bales were anchored to the ground on November 8, 1995.

4.4.12 Rising Sun Site

Backfill Mine Openings - The Rising Sun Shaft was backfilled with approximately 55 cubic-yards of material excavated from the adjacent dump. The disturbed area was graded to blend with the surrounding contours using maximum 3H:1V slopes. Baxter reclaimed this site on October 27, 1995, using his JD 755 track-loader.

Seed and Fertilize - The 0.050 acre disturbed by construction was seeded and fertilized by the broadcast method on October 27, 1995. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized. After seeding the reseeded area was to be tracked. Due to the limited access requirements, access route reclamation was not required.

4.4.13 Storm King Site

Bulkhead and Shaft Timber Removal - On October 9, 1995, Baxter removed the remains of the surface bulkhead and the top 10 feet of timbers from Shaft #1. The wood debris was removed from the site on October 27, 1995.

Backfill Mine Openings - Pits #1 and #2 were backfilled with material from the adjacent mine dumps on October 9, 1995. On October 9, 1995, Shaft #1, the subsidence feature, and the associated surface cut were backfilled with material from the adjacent dump. The backfilling operation consumed the entire dump associated with Shaft #1. On October 20, 1995, the track-loader was used to regrade the area disturbed by construction.

Clear and Grub - Where required clearing and grubbing was accomplished ahead of cover soil stripping.

Salvage and Replace Topsoil - Between October 9th and 11th, 1995, cover soil was intermittently recovered from the disturbance areas and stockpiled. This material was typically replaced on regraded area by the next day.

Adit Demolition and Backfilling - On October 9, 1995, the JD 792 excavator was used to completely demolish the first 53 feet of Adit #2 by digging-out the adit timbers and lagging. Nearly all of the timbers were removed from the excavated area. The adit excavation began at the portal and extended into 9 feet of cover at the end. Probing into the caved material which blocked the adit at this point determined that the adit was still open beyond this point. Consequently, a substantial plug was placed in the open section of adit. Then the collapsed and excavated area along the adit was backfilled. The wood debris was removed from the site on October 27, 1995.

On October 10, 1995, the JD 792 excavator was used to completely demolish the first 24 feet of

Adit #3 by digging-out the adit timbers and lagging. Nearly all of the timbers were removed from the excavated area. The adit was probed for an additional 10 feet and was determined to be completely caved.

On October 10-11, 1995, the JD 792 excavator was used to completely demolish the first 75 feet of Adit #1 by digging-out the adit timbers and lagging. Nearly all of the timbers were removed from the excavated area. Baxter attempted to excavated back to where the adit had caved; but, the rock over the adit roof became too hard to dig. So, 25 feet of adit had to be left intact. There was around 15 feet of cover over the adit where the excavation ended. After the mine timbers had been removed, a substantial plug was placed in the open section of adit. Then the collapsed and excavated area along the adit was backfilled.

On October 20, 1995, the JD 755 track-loader was used to grade each of the disturbed areas as a broad swale draining toward the road. Slopes did not exceed 3H:1V.

Probe Mine Openings - Prior to backfilling Adit 2 and Adit 3, these openings were probed. Adit #2 was found to be open behind a section of caved roof and required a plug. Adit 3 was probed for 10 feet and was caved at least back to this point. Prior to backfilling Shaft #1, this opening was probed to a depth of 16 feet below the collar. The JD 792 excavator with its long reach and a 1-2 yard bucket performed this operation.

Adit Closure - Adit 1 and Adit 2 both had open sections of adit remaining after demolition had progressed as far as possible. A backfill plug was installed inside each of these adits to seal the underground openings. Adit 3 was determined to be caved and did not require a closure. Adit closure work was accomplished from October 9th through October 11th, 1995.

Seed and Fertilize - The affected areas associated with Pit #1, Pit #2, and Shaft 1 (0.054 acre) were seeded and fertilized by the broadcast method on October 20, 1995. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized.

Fertilize, Seed, and Mulch - All areas disturbed at Adit 1, Adit 2, and Adit 3 were seeded, fertilized and mulched. On October 20, 1995, fertilizer was spread on the disturbed areas. On November 8, 1995, 0.377 acre of construction disturbance was seeded by the broadcast method. The specified application rates for seed (48 PLS) and fertilizer (92.5 pounds of nutrients per acre) were utilized. On the same day the area was seeded, 3,000 pound per acre of straw mulch was applied and crimped. The mulch was "Montana Certified Weed Seed Free".

Straw Bales - Erosion control measures at the bottom of each of the regraded areas consisted of a total of 11 bales of "Montana certified weed seed free" straw. The bales were anchored to the ground on November 8, 1995.

4.4.14 Silversmith Site

Bulkhead and Shaft Timber Removal - On October 12, 1995, Baxter used the hydraulic excavator to remove the surface bulkhead and the top 15 feet of timbers and wood planks lining the shaft. All debris from these operations was hauled to the local landfill on October 18, 1995. The shaft timbers were not removed until the shaft had been backfilled to within 15-feet of the surface.

Backfill Mine Openings - On October 12, 1995, Baxter used the hydraulic excavator to backfill the shaft with material borrowed from the north end of the dump. All borrow areas were regraded with slopes not exceeding 2½H:1V. The Silversmith headframe was moved to allow shaft backfilling activities.

4.4.15 Bluebird Trail Additive Work

Bluebird Trail Grading - On October 13, 1995, Baxter and the construction inspector met with representatives of Butte-Silver Bow to establish gate locations which would define the section of road to be graded. During the meeting, Butte-Silver Bow informed the Contractor that it would be unable to supply any material for surfacing the road or for filling deep ruts.

On October 16, 1995, Baxter moved a Caterpillar 12E motor grader and a Michigan 110-11 elevating scraper onto the site and began grading the road. Baxter hauled and placed 110 cubic-yards of fill material in areas where deep ruts and washes could not be eliminated by blading. Baxter then proceeded to reshape and smooth the road, completing the work on October 19, 1995.

Bluebird Trail Concrete Barrier and Gate Installation - A barrier and gate system was installed at each end of the Bluebird Trail. The concrete mounts for the gates were formed and poured between October 26th and October 31st, 1995. The gates were hung on November 6,1995. The "Kelly Humps" were dug on November 9,1995. Because gate installations required some excavation and concrete work in the road surface, short sections of the road were closed for a short period.

4.5 Quantities Used

All work items except mobilization and debris removal were bid on a unit price basis. An on-site construction inspector measured items for payment and recorded load counts. Bid quantities were adjusted based on field measurements.

Item	Amount	Unit Cost
Mobilization	1 LS	$15,000.00 lump sum
Provide Water	0 Kgal	$25.00 per Kgal
Adit Closure	4 EA adit	$300.00 per Closure
Adit Demolition and Backfilling	350 FT	$10.00 per Foot of adit
Backfill Mine Openings	5830 CY	$2.00 per Cubic Yard
Bulkhead and Shaft Timber Removal	6 EA shaft	$500.00 per Shaft
Clear and Grub	0.505 Acre	$1,000.00 per Acre
Tri-Deck Beam Shaft Closure	2232SqFt	$24.65 per Square Foot
Dump Excavation	0 CY	$2.50 per Cubic Yard
Debris Clean-Up	1 LS	$750.00 lump sum
Fertilize, Seed and Mulch	0.907 Acre	$1,500.00 per Acre
Probe Mine Opening	7 EA	$500.00 per Opening
Road Relocation	150 FT	$2.00 per Foot
Salvage and Replace Topsoil	400 CY	$3.00 per Cubic Yard
Seed and Fertilize	2.149 Acre	$750.00 per Acre
Structure Removal	2 EA	$150.00 per Structure
Straw Bales for Erosion Control	30 EA	$10.75 per Bale
Road Grading	1.64 Miles	$1,000.00 per Mile
Haul and Spread	110 CY	$6.50 per Cubic Yard
Bluebird Trail Concrete Barrier & Gate Install	2 EA	$2,400.00 per Barrier

5. PAYMENT REQUESTS

5.1 Pay Request

One pay request was processed for this project as addressed under Section 3.10 above. A copy has been included in ATTACHMENT 1.

5.2 Cost per Site

SITE	CONSTRUCTION	MOBILIZATION	TOTAL COST
Apex Site	950.00	500.00	$ 1,450.00
Great Republic Site	1,921.25	500.00	$ 2,421.25
Nemo South Site	2,246.50	500.00	$ 2,746.50
Nettie Main Site	3,368.75	1,000.00	$ 4,368.75
Nettie Incline Site	3,025.00	500.00	$ 3,525.00
Olson Fraction Site	267.75	500.00	$ 767.75
Plutus Site	28,674.40	3,000.00	$31,674.40
Prospector Site	30,556.90	3,000.00	$33,556.90
Atomic Site	2,600.75	750.00	$ 3,350.75
Railroad Adit 1 Site	1,544.25	750.00	$ 2,294.25
Railroad Adit 2 Site	2,553.25	750.00	$ 3,303.25
Rising Sun Site	147.50	200.00	$ 347.50
Storm King Site	5,732.25	750.00	$ 6,482.25
Silversmith Site	140.00	500.00	$ 640.00
Bluebird Trail	7,655.00	1,800.00	$ 9,455.00

5.3 Total Project Cost

The total project cost was $242,932.03. Of this total, the construction cost for the project was $106,383.55. Baxter Construction was awarded the contract for an original bid of $122,085.05. One change order was issued for a net decrease of $5,701.50.

Total cost incurred for the project under the engineering contract amounted to $119,126.92 or about 112-percent of the construction cost. This value includes significant expenditures for site characterization, sampling, shaft probing, and the mitigation of hazardous mine openings at 19 individual sites. In 1994, $21,261.25 was spent on laboratory analysis. An additional, $8,795.58 was expended to have Braun Intertec assist in sample collection and prepare a report characterizing the available fill material. Braun also evaluated potential groundwater impacts associated with using waste rock from adjacent dumps as backfill. Equipment rental for site investigation and mitigation amounted to $12,139.50. The cost for engineering also includes preparation of a Health and Safety Plan, a Sampling and Analysis Plan, a Report of Investigations, and designs for several sites that were dropped from the bid package.

Construction inspection and project management required an expenditure of $17,421.56. An analysis of the engineering costs versus construction costs was presented in ATTACHMENT 4.

6. PROJECT SUMMARY

6.1 Summary of Project

The history of the West Butte HMO Reclamation Project can be traced back to April 1989 when Hydrometrics (on contract with the AMRB) directed Piper & Associates, Inc., to provide an inventory of hazardous shafts and surface exposed mine workings in the West Butte area. Piper submitted its inventory of 47 abandoned mine sites on November 30, 1989. The reported was titled: *INVENTORY OF ABANDONED MINE SITES IN THE AREA SOUTHWEST, WEST AND NORTHWEST OF METROPOLITAN BUTTE, MONTANA*. A significant number of the inventoried sites were shafts which were reported to have been sealed with wooden bulkheads located at some distance below the surface.

In March of 1994, Spectrum Engineering received an approved task order for $114,710.30 to perform field investigations, waste dump sampling and analysis, mine shaft water sampling and analysis; to develop engineering designs; to prepare a bid package for construction of the project; to perform pre-bid administration; and, to provide project documentation. Spectrum Engineering was also directed to submit: (1) a health and safety plan (HSP); and, (2) a sampling and analysis plan (SAP) for the project. The sampling and analysis plan was to be patterned after requirements developed by Pioneer Technical Services and was to follow EPA protocol.

The AMRB retained responsibility for:

(1) Securing landowner consent;
(2) Performing lien determination:
(3) Performing all historical and cultural work;
(4) Providing base maps of the project area and its features; and,
(5) Working with the Butte-Silver Bow GPS to establish property lines.

On March 22, 1994, Bill Maehl of Spectrum Engineering toured the project area with Dan Koszuta, who was the AMRB's project manager. After the initial site tour, Spectrum Engineering prepared a Health and Safety Plan and a Sampling and Analysis Plan. Arrangements were made with Energy Laboratories in Billings to process samples. And, Braun Intertec was subcontracted with to provide an evaluation of waste rock and groundwater characteristics in the project area.

In May 1994, Spectrum Engineering personnel assisted Shane Bofto of Braun Intertec in collecting dump samples. During this period, mine features which were visible at the surface were measured and recorded. Site and preliminary work descriptions were prepared for a draft bid package using this information.

Based on field observations and the information provided in the Piper inventory report, eight shafts which were thought to be covered with bulkheads were selected for the shaft water characterization study. Hollow Construction of Butte was contracted to supply a hydraulic excavator and operator to uncover these shafts, so water samples could be collected. In July 1994, Shane Bofto, Dave Murja, and Dan Koszuta met at the project area to conduct these investigations. The shafts at the Kit Carson, Mapleton, Minnie Jane, Norwich, and Olive Branch were all probed to a depth of about 20 feet. Because only rotted mine timbers could be located during excavation, it was concluded that these shafts had either been backfilled or had caved. When the Germania #1 shaft was probed, solid timbers were exposed in the shaft. However, the opening had been backfilled to at least a depth of 20 feet. This shaft might still be open at some greater depth; but, it was sufficiently blocked to prevent even our determined access. At the Plutus Shaft and at the Prospector Shaft, surface bulkheads were uncovered and then partially

removed to expose the openings. Unfortunately, water samples could not be taken at either of these sites because both shafts were blocked 15 to 30 feet below the collar. The Prospector and Plutus shafts were later capped during the construction phase of the project. While the excavator was at the Olive Branch Site, an apparently backfilled shaft which had subsided was probed and then completely backfilled.

After completing these field investigations and reviewing the laboratory analyses, Braun Intertec submitted a three volume report titled: *WEST BUTTE HAZARDOUS MINE OPENING FILL MATERIAL/WASTE ROCK AND GROUNDWATER CHARACTERIZATION AND BENEFICIAL USE SURVEY*. Their report was dated November 16, 1994.

On July 21, 1994, a preliminary draft of the special provisions section of the bid package was submitted for review. Dan Koszuta suggested that the shaft probing program, which had all ready eliminated seven shafts from the bid package, should be expanded. On August 10th-12th,1994, Hollow Construction remobilized its hydraulic excavator and probed an additional 12 shafts. After probing, the sites were backfilled and regraded. Because the excavator contractor had to meet another commitment, the probing operation was shut down until August 23, 1994. During the period from August 23rd through August 30th, 1995, the probing and backfilling operation completed work on an additional 16 shafts, 2 inclines, 1 subsidence hole and 35 prospect pits.

In September 1994, a narrative was prepared for final SHIPO clearance of the project. While waiting for final clearance of the sites, work continued on a draft bid package containing the remaining sites. A draft bid package was sent to the AMRB on November 16, 1994. On January 4, 1995, the *FIELD INVESTIGATION REPORT* was submitted. This report contained photo documentation, maps, and narratives describing those sites where probing and backfilling operations occurred.

Dan Koszuta reviewed the draft and presented his suggested revisions in March, 1995. These revision deleted the Kane/Pacific, Carrie and Hibernia sites from the package and eliminated the large trench from the work planned at the Great Republic Site. Plans to rehabilitate the Silversmith headframe were also deleted. Dan Koszuta left the AMRB soon after and was replaced as the AMRB Project Manager by Jack Yates while these revisions were still being incorporated in the package.

By June 1995, Jack Yates had worked out some plans with Butte-Silver Bow to improve the Bluebird Trail. After these work descriptions were incorporated, another draft package was submitted for review. Final bid documents for the West Butte HMO Reclamation Project were finally shipped to the AMRB on July 17, 1995.

The project was bid on August 10, 1995, and awarded to Baxter Construction of Billings, Montana. Baxter was the low bidder at $122,085.05. The bid was about 10-percent lower than the Engineer's Estimate. Baxter mobilized to the project area on October 4, 1995. All work was completed by November 10, 1995 after 39 contract days had expired. One change order was issued at the end of construction to adjust the actual quantities of work completed. The change order resulted in a net decrease of $5,701.50 primarily because Butte-Silver Bow could not supply surfacing material for the Bluebird Trail. Baxter rented some equipment from Hollow Construction of Butte and used their operators and masons for a portion of the work.

The project resulted in the closure of hazardous mine openings at fourteen sites near Butte Montana. During construction 30 mine openings were closed by backfilling, 6 mine adits were closed by demolition and backfilling, and 2 deep shafts were closed with structural concrete covers. For the entire project, however, mitigation was completed on 111 mine openings. This

number includes the 73 openings which were probed and backfilled during the investigation phase plus the 38 mine closures completed during construction.

6.2 Site Condition after Completion

At the Apex Site, all mine openings were either completely backfilled or plugged. Much of the area was regraded and seeded. However, the large mine dump on the site was only partially removed and still has the general appearance of a mine dump. Although the mine openings which were plugged are no longer accessible, mine workings extending out from the plugged openings still exist beneath the surface.

With the closure of the two shafts and the two mine openings which connected into underground workings, all of the obvious mine related hazards at the Great Republic Site were abated. However, the area that was regraded during these operations is small in comparison the large area at this site that has been impacted by past mining activity. The mine related features remaining on the site include a large trench with vertical sides and several large mine dumps. The general appearance of the site is still very much as it was before the four small mine openings were closed.

The subsidence depression created by the caved shaft at the Nemo South Site was backfilled and a large mound was placed over the area where the shaft was located. The road that skirted along the edge of the subsidence cone was relocated. Approximately fifty-percent of the area that was occupied by mine dumps and excavations was completely regraded. One large lobe of the dump was left in its original condition; so, the site still retains much of its mining character.

The subsidence depression created by the caved shaft at the Nettie Main Site was backfilled and a large mound was placed over the area where the shaft was located. This shaft is reported to have been 900 feet deep. Looking at the area around the caved shaft, it appeared that enough material to fill about one-third of the shaft had been removed from the area around the collar. For hazard mitigation, another 1600 cubic-yards of material was placed in the subsidence area. Site mitigation was confined to addressing the potential problem that could result from future subsidence in the shaft. Consequently, the Nettie Main Site retained its appearance as an unreclaimed abandoned mine.

The subsidence depression created by the caved incline at the Nettie Incline Site was backfilled with material borrowed from several of the lobes of the mine dump surrounding the opening. Two large, concrete sections of the collapsed portal were buried in the depression. Since the opening at this site was an incline, it is unlikely that any further subsidence will be experienced. Any hazard presented by the subsidence depression has been abated. On the other hand, the site still looks like a mine dump.

All known hazards and other mine related impacts were eliminated as completely as possible at the Olson Fraction Site. The small mine openings were completely backfilled and the mine dumps were regraded.

At the Plutus Site the wooden surface bulkhead covering the 400 foot deep shaft was replaced with a structural concrete cover. The general character of the site was not significantly changed by this mitigation. However, the new shaft cover should last indefinitely.

At the Prospector Site the wooden surface bulkhead covering the 810 foot deep shaft was

replaced with a structural concrete cover. The general character of the site was not significantly changed by this mitigation. However, the new Tri-deck beam shaft cover should provide long term closure of the shaft. Before the cover was installed, enough material was dumped into the shaft to choke the top 400 feet of the shaft making a collar failure very unlikely. Approximately 20-percent of the dump was regraded to affect this closure.

All known hazards and other mine related impacts were eliminated as completely as possible at the Atomic Site, the Railroad Adit 1 Site, the Railroad Adit 2 Site, the Rising Sun Site, and the Storm King Site. These sites were completely regraded and reseeded. There are still some shallow pits and other mine related disturbances in the area around these sites. In addition, some of the abandoned mine workings are still open underground. However, these openings have been plugged and buried, so they are no longer accessible from the surface.

The shaft at the Silversmith Site was backfilled to eliminate the apparent hazard to public safety. Most of the mine dump and the loading platform were felt undisturbed. The wood headframe, which had toppled, was left lying on its side near the dump. This 5' x 5' shaft is reported to have been 60 feet deep. However, the shaft had caved around the collar choking the bottom section of the shaft. Although only the top 31 feet of the opening could be backfilled, enough backfilling material was put into the opening to fill an opening with 6' x 6' dimensions to a depth of over 50 feet. This analysis suggests that the shaft has been permanently closed and would not pose a significant hazard even if there was some future subsidence.

The road base on the Bluebird Trail was graded as specified. Gate mounts, gates and barriers were installed at both ends of the trail.

6.3 Maintenance or Follow-up

All of the sites should be checked to monitor revegetation success. It is unlikely that any of the sites on the north side of Interstate 90 will have much success because only barren waste material was available for backfill. However, the sites on the south side of the Interstate should have a good chance of success.

6.4 Construction Bid Package

Copies of the site plan drawings which were provided in the bid package are located in ATTACHMENT 5 at the back of the final report. These site plan drawings represent the reclamation engineering design (the plan from which the contractors bid the work).

6.5 As-Built Drawings

As-built drawings are located in ATTACHMENT 6.

7. COMMENTS/SUGGESTIONS

When this project was being planned and the estimates were being developed for the Task Order, there was apparently an overriding assumption that somehow we would uncover numerous deep shafts that might be closed by backfilling. This drove the design phase toward a program that incorporated extensive sampling and analysis. In retrospect, all but two of the openings were relatively shallow or had caved. Consequently only a small percentage of analytical information had any practical application.

The next time probing operations are conducted on a suspected deep shaft, it would be a good idea to have a shaft-closure grate available near the site; so, a temporary closure can be installed on short notice. When we investigated the Prospector Shaft, we were afraid of damaging the surface bulkhead because our only other closure option would have been to backfill the shaft. The inspection of the shaft was made through a small hole in the deck. If the surface bulkhead had been removed, a more thorough inspection could have been done and our information on the shaft might have been more valid. Because we could not open any of the shafts, we lost an opportunity to acquire site specific information on shaft water quality.

The Butte-Silver Bow GPS supplied us with great maps. Although this project had a large number of scattered sites, the property lines and site features shown on these maps made the sites and openings easy to locate in the field.

8. PHOTOGRAPHS/SLIDES

8.1 Listing

A description of the photographs taken to document the work performed is found at the back of the final report under ATTACHMENT 7. The numbers on each picture correspond to the picture number on the listing and to the photo location number on the As-Built Drawing/Photo Index drawing in ATTACHMENT 6. The pictures are organized according to the following topics:

PICTURES	TOPIC
1-4	Contractor's Equipment
5-13	Apex Site
14-23	Great Republic Site
24-33	Nemo South Site
34-44	Nettie Main Site
45-47	Nettie Incline Site
48-51	Olson Fraction Site
52-62	Plutus Site
63-72	Prospector Site
73-77	Atomic Site
78-81	Railroad Adit 1 Site
82-88	Railroad Adit 2 Site
89-91	Rising Sun Site
92-104	Storm King Site
105-109	Silversmith Site
110-114	Bluebird Trail

ATTACHMENT 1

BID TABULATION

BID TABULATIONS				ENGINEER'S ESTIMATE		BAXTER CONSTRUCTION		H&H CONTRACTING, INC.		MARQUIS EXCAVATING	
Item Number	Estimated Quantity	Unit	Description	Unit Price	Total Price						
1.	1	LS	MOBILIZATION	20,000.00	20,000.00	15,000.00	15,000.00	12,457.23	12,457.23	20,000.00	20,000.00
2.	20	KGAL	PROVIDE WATER	35.00	700.00	25.00	500.00	170.00	3,400.00	250.00	5,000.00
3.	5	EA	ADIT CLOSURE	400.00	2,000.00	300.00	1,500.00	260.60	1,303.00	2,000.00	10,000.00
4.	383	FOOT	ADIT DEMOLITION AND BACKFILLING	35.00	15,320.00	10.00	3,830.00	49.59	18,992.97	10.00	3,830.00
5.	4770	CY	BACKFILL MINE OPENINGS	2.50	11,925.00	2.00	9,540.00	3.42	16,313.40	3.00	23,850.00
6.	6	EA	BULKHEAD AND SHAFT TIMBER REMOVAL	900.00	5,400.00	500.00	750.00	783.69	4,702.14	1,000.00	6,000.00
7.	0.505	ACRE	CLEAR AND GRUB	900.00	454.50	1500.00	505.00	6,468.30	3,266.49	6,000.00	3,030.00
8.	2232	SQ FT	TRI-DECK BEAM SHAFT CLOSURE	35.00	66,960.00	24.65	55,018.80	24.26	54,148.32	29.12	64,995.84
9.	110	CY	DUMP EXCAVATION PROSPECTOR SITE	3.00	330.00	2.50	275.00	5.29	581.90	3.00	330.00
10.	1	LS	DEBRIS CLEAN UP	600.00	600.00	750.00	750.00	356.91	356.91	2,000.00	2,000.00
11.	0.907	ACRE	FERTILIZE, SEED AND MULCH	1400.00	1,269.80	1500.00	1,360.50	3,976.97	3,607.11	2,000.00	1,814.00
12.	5	EA	PROBE MINE OPENING	300.00	1,500.00	500.00	2,500.00	636.11	3,180.55	1,000.00	5,000.00
13.	150	FOOT	ROAD RELOCATION NEMO SOUTH SITE	5.00	750.00	2.00	300.00	1.94	291.00	10.00	1,500.00
14.	400	CY	SALVAGE AND REPLACE TOPSOIL	2.00	800.00	3.00	1,200.00	10.91	4,364.00	20.00	8,000.00
15.	2.149	ACRE	SEED AND FERTILIZE	500.00	1,074.50	750.00	1,611.75	1,694.09	3,640.60	20,000.00	3,223.50
16.	2	EACH	STRUCTURE REMOVAL	600.00	1,200.00	150.00	300.00	411.11	822.22	2,500.00	5,000.00
17.	32	EACH	STRAW BALES FOR EROSION CONTROL	12.00	384.00	10.75	344.00	17.88	572.16	7.50	240.00
			BASE BID TOTAL	25,729.50	130,667.80		97,535.05		132,000.00		163,813.34
1A.	150	MILE	BLUEBIRD TRAIL GRADING ROAD GRADING	1800.00	2,340.00	1,000.00	1,300.00	846.20	1,100.06	20,000.00	4,940.00
2A.	1300	CY	BLUEBIRD TRAIL GRADING HAUL AND SPREAD	2.60	3,380.00	6.50	8,450.00	7.70	10,010.00	10.00	15,600.00
3A.	2	EACH	BLUEBIRD TRAIL CONCRETE BARRIER & GATE	1400.00	2,300.00	2,400.00	4,800.00	2,500.00	5,000.00	4,000.00	8,000.00
			ADDITIVE TOTAL		8,020.00		14,550.00		16,110.06		28,540.00
			TOTAL		138,687.80		112,085.05		148,110.06		192,353.34

G:\RECLAM\AMRB\BID-TAB.TBL -- SAVE TO DIFFERENT NAME (PROJECT NAME) WHEN USED

WEST BUTTE HMO RECLAMATION PROJECT
SILVER BOW COUNTY, MONTANA

DEQ/AMRB 94-009
AUGUST 10, 1995

BID TABULATIONS				ENGINEER'S ESTIMATE		HYDROMETRICS, INC.					
Item Number	Estimated Quantity	Unit	Description	Unit Price	Total Price						
1.	2	LS	MOBILIZATION	20,000.00	20,000.00	25,000.00	25,000.00		0.00		0.00
2.	20	KGAL	PROVIDE WATER	35.00	700.00	25.00	500.00		0.00		0.00
3	5	EA	ADIT CLOSURE	35.00	2,000.00	5,000.00	25,000.00		0.00		0.00
4.	383	FOOT	ADIT DEMOLITION AND BACKFILLING	35.00	15,320.00	150.00	57,450.00		0.00		0.00
5.	4770	CY	BACKFILL MINE OPENINGS	2.50	11,925.00	4.00	19,080.00		0.00		0.00
6.	6	EA	BULKHEAD AND SHAFT TIMBER REMOVAL	900.00	5,400.00	500.00	3,000.00		0.00		0.00
7.	0.505	ACRE	CLEAR AND GRUB	900.00	454.50	2,500.00	1,262.50		0.00		0.00
8.	2232	SQ FT	TRI-DECK BEAM SHAFT CLOSURE	30.00	66,960.00	35.80	79,905.60		0.00		0.00
9.	110	CY	DUMP EXCAVATION PROSPECTOR SITE	3.00	330.00	25.00	2,750.00		0.00		0.00
10.	1	LS	DEBRIS CLEAN UP	600.00	600.00	500.00	500.00		0.00		0.00
11.	0.907	ACRE	FERTILIZE, SEED AND MULCH	1400.00	1,269.80	2,500.00	2,267.50		0.00		0.00
12.	5	EA	PROBE MINE OPENING	300.00	1,500.00	500.00	2,500.00		0.00		0.00
13.	150	FOOT	ROAD RELOCATION NEMO SOUTH SITE	5.00	750.00	20.00	3,000.00		0.00		0.00
14.	400	CY	SALVAGE AND REPLACE TOPSOIL	2.00	800.00	20.00	8,000.00		0.00		0.00
15.	2.149	ACRE	SEED AND FERTILIZE	500.00	1,074.50	1,400.00	3,008.60		0.00		0.00
16.	2	EACH	STRUCTURE REMOVAL	600.00	1,200.00	1,000.00	2,000.00		0.00		0.00
17.	32	EACH	STRAW BALES FOR EROSION CONTROL	12.00	384.00	10.00	320.00		0.00		0.00
			BASE BID TOTAL	25,729.50	130,667.80		235,544.20		0.00		0.00
1A.	1.3	MILE	BLUEBIRD TRAIL GRADING ROAD GRADING	1800.00	2,340.00	1,400.00	1,950.00		0.00		0.00
2A.	1300	CY	BLUEBIRD TRAIL GRADING HAUL AND SPREAD	2.60	3,380.00	10.00	4,550.00		0.00		0.00
3A.	2	EACH	BLUEBIRD TRAIL CONCRETE BARRIER & GATE	1150.00	2,300.00	2,500.00	3,000.00		0.00		0.00
			ADDITIVE TOTAL		8,020.00		9,500.00		0.00		0.00
			TOTAL		138,687.80		245,044.20		0.00		0.00

G:\RECLAM\AMRB\BID-TAB.TBL -- SAVE TO DIFFERENT NAME (PROJECT NAME) WHEN USED
USE SECOND SHEET IF MORE THAN 4 BIDDERS

ATTACHMENT 2

CHANGE ORDERS

CHANGE ORDER

ORDER NO. 1

PROJECT TITLE: West Butte HMO Reclamation Project

MONT A/E or DSL-AMRB: 94-009

CONTRACT DATE: September 5, 1995

OWNER: Department of Environmental Quality, Abandoned Mine Reclamation Bureau

CONTRACTOR: Baxter Construction

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment, and miscellaneous. Show percent where applicable.)

ITEM NO.	DESCRIPTION OF CHANGES - ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS	LABOR	EQUIP	MISC	TOTAL UNIT COST	
2	Provide Water was deleted.					(500.00)	(500.00)
3	The adit closure at the Atomic Site was not required because probing determined the adit had caved. (1 adit X $300)					(300.00)	(300.00)
4	The contract quantity of 383 feet of adit demolition and backfilling was measured for payment at 350 feet reducing the quantity by 33 feet at $10 per foot.					(330.00)	(330.00)
5	Actual quantity of material required to backfill mine openings was 5,830 CY or 1,060 CY more than the contract quantity at a unit cost of $2 per CY. (1,060 CY x $2/CY)					2,120.00	2,120.00
9	Excavation of the dump at the Prospector Site was not required.					(275.00)	(275.00)
12	The number of caved mine shafts to be probed was increased from 5 to 7 at the contract unit price of $500 per opening. (2 X $500)					1,000.00	1,000.00
17	The actual number of straw bales used for erosion control was counted at 30 reducing the contract quantity by 2 at $10.75 per bale					(21.50)	(21.50)
1A	Road grading on the Bluebird Trail was increased from 1.30 to 1.64 miles at the contract unit price (0.34 mi X $1000)					340.00	340.00
2A	Haul and spread on the Bluebird Trail was reduced from 1300 CY to 110 CY (1190 CY X $6.50)					(7,735.00)	(7,735.00)
	TOTAL COST - MATERIALS, LABOR, EQUIPMENT & MISC.						(5,701.50)
	OVERHEAD & PROFIT @ _____%						INC.
	GRAND TOTAL - THIS CHANGE ORDER						($5,701.50)

Original Contract Price	$ 112,085.05
Current Contract Price Adjusted by Previous Change Order	$ 112,085.05
Cost this Change Order (+ or -)	- $ 5,701.50
New Contract Price including this Change Order	$ 106,383.55

The completion date as set forth in the Contract Documents shall be (increased, decreased) by ___0___ calendar days excluding weather days already allowed.

The date for completion of all work will be ___11/10/1995___ plus weather days.

Description of Change:

This change order makes the final quantity adjustments for all pay items .

SURETY CONSENT

The Surety hereby consents to the aforementioned Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as thereby modified or amended per this Change Order. The Principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bonds or Bonds is hereby increased by $_____ (100% of the Change Order amount) and the penalty of the applicable Labor and Material Bond or Bonds is hereby increased by $_____ (100% of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT

See Attached

[signature]

SURETY

By: _____

Seal

Recommended by: Baxter Construction [signature] 12-18-95

Contractor Date

Accepted by: Spectrum Engineering [signature] 11-20-95

Engineer Date

Approved by: DEQ/AMRB [signature] 12/21/95

Owner Date

ATTACHMENT 3

PAYMENT REQUESTS

FINAL PAYMENT REQUEST

FROM 10/04/1995 TO 11/10/1995

PROJECT TITLE: WEST BUTTE HMO RECLAMATION PROJECT

LOCATION: SILVER BOW COUNTY MONT DSL-AMRB: 94-009

NAME OF CONTRACTOR: BAXTER CONSTRUCTION

ADDRESS: 4014 HARDIN ROAD, BILLINGS, MONTANA 59101

SUMMARY OF PROJECT STATUS

Amount of Original Contract		$ 112,085.05
Change Order No. 1	$ -5,701.50	
Change Order No. ____	$	
Change Order No. ____	$	
Amount of Approved Change Order(s)		$ -5,701.50
TOTAL CONTRACT AMOUNT		$ 106,383.55

Pay Request No.	Amount of Request
FINAL	$106,383.55

Total Contract Amount Completed to Date	$ 106,383.55
Less Retainage (0 %)	$ 0.00
TOTAL AMOUNT EARNED TO DATE	$ 106,383.55
Less Previous Payments	$ 0.00
AMOUNT DUE THIS PAYMENT	$ 106,383.55
Less 1% Tax	$ 1,063.84
TOTAL DUE CONTRACTOR	$ 105,319.71

I certify that this claim is correct and just in all respects and that payment or credit has not been received.

BAXTER CONSTRUCTION
Contractor

By Ed Baxter

Date 12 18 - 95

RECOMMENDED BY:

SPECTRUM ENGINEERING INC.
Engineer

By David M. Murja

Date 11 - 20 - 95

APPROVED BY:

DEPARTMENT OF ENVIRONMENTAL QUALITY,
ABANDONED MINE RECLAMATION BUREAU
Owner

By Jack D. Yates DEQ/AMRB

Date 12/21/95

RESP. CNTR. 222 - 96000301 - F

CBT EXP 2 21

APPROVAL Vic R Anders

12 - 22 - 95

Rev. 3/91

Item No.	BASE BID ITEMS Description	Contract Quantity	Contract Unit Price	Previous Quantity Requested	Current Quantity Completed	Total Quantity Completed to Date	Total Contract Amount Completed to Date	Amount Due this Payment
1.	Mobilization	1 LS	15,000.00		1	1	15,000.00	15,000.00
2.	Provide Water	20.0 Kgal	25.00		4	4	0.00	0.00
3.	Adit Closure	5 EA adit	300.00		4	4	1,200.00	1,200.00
4.	Adit Demolition and Backfilling	383 FT	10.00		350	350	3,500.00	3,500.00
5.	Backfill Mine Openings	4770 CY	2.00		5830	5830	11,660.00	11,660.00
6.	Bulkhead and Shaft Timber Removal	6 EA shaft	500.00		6	6	3,000.00	3,000.00
7.	Clear and Grub	0.505 Acre	1,000.0		0.505	0.505	505.00	505.00
8.	Tri-Deck Beam Shaft Closure	2232SqFt	24.65		2232	2232	55,018.80	55,018.80
9.	Dump Excavation Prospector Site	110 CY	2.50		0	0	0.00	0.00
10.	Debris Clean-Up	1 LS	750.00		1	1	750.00	750.00
11.	Fertilize, Seed and Mulch	0.907 Acre	1,500.00		0.907	0.907	1,360.50	1,360.50
12.	Probe Mine Opening	5 EA	500.00		7	7	3,500.00	3,500.00
13.	Road Relocation Nemo South Site	150 FT	2.00		150	150	300.00	300.00
14.	Salvage and Replace Topsoil	400 CY	3.00		400	400	1,200.00	1,200.00
15.	Seed and Fertilize	2.149 Acre	750.00		2.149	2.149	1,611.75	1,611.75
16.	Structure Removal	2 EA	150.00		2	2	300.00	300.00
17.	Straw Bales for Erosion Control	32 EA	10.75		30	30	322.50	322.50
	ADDITIVE BID ITEMS							
1A.	Bluebird Trail Grading Road Grading	1.30 Miles	1,000.00		1.64	1.64	1,640.00	1,640.00
2A.	Bluebird Trail Grading Haul and Spread	1300 CY	6.50		110	110	715.00	715.00
3A.	Bluebird Trail Concrete Barrier & Gate Install	2 EA	2,400.00		2	2	4,800.00	4,800.00
	Materials on Site (Attach Schedule)	--	--	$	$	--	$0.00	$0.00
	TOTALS						$106,383.55	$106,383.55

ELK RIVER CONCRETE PRODUCTS CO. OF MONTANA

AFFILIATED WITH THE CRETEX COMPANIES, INC.
P.O. BOX 1180 • HELENA, MONTANA 59624
TELEPHONE (406) 442-8060 • FAX (406) 442-8038

Post-it® Fax Note 7671	Date 11/17	# of pages ▶ 1
To BILL MAEHL	From J. YATES	
Co./Dept. SPECTRUM	Co. DEQ/AMRB	
Phone #	Phone #	
Fax # 259-1456	Fax #	

November 17, 1995

Jack Yates
C/O DEQ/AMRB
P. O. Box 201601
Helena, MT 59620-1601

Re: WEST BUTTE HMO PROJECT - BEAM REPAIR

Gentlemen:

On November 15, 1995, Elk River Concrete Products Company of Montana made the requested repair to the damaged shaft cap beam.

This beam in its present location and state will function as it was originally designed. (Mine shaft cap)

Thank you for your cooperation in working with us on this project.

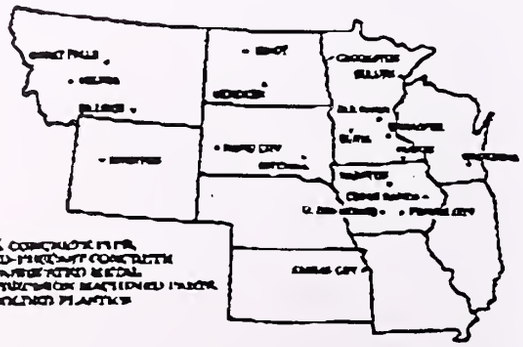
Sincerely,

ELK RIVER CONCRETE PRODUCTS
COMPANY OF MONTANA

Robert J. Ganter
President

RJG/pk

Copy: Baxter Construction



Post-it® Fax Note 7671	Date 11/17	# of pages ▶ 1 of 1
To JACK YATES	From BOB GANTER	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # 444-1923	Fax #	

ATTACHMENT 4

ANALYSIS OF CONSULTANT COSTS INCURRED

ANALYSIS OF CONSULTANT COSTS INCURRED
FOR THE MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU
AMR PROJECT NUMBER: DSL-AMRB 94-009
WEST BUTTE HMO RECLAMATION PROJECT

DATE OF PREPARATION: JANUARY 3RD, 1996

ENGINEERING SERVICE	AMOUNT
DESIGN ENGINEERING	$119,126.92
CONSTRUCTION INSPECTION:	$ 11,247.74
CONSTRUCTION ADMINISTRATION :	$ 6,173.82
TOTAL CONSTRUCTION ENGINEERING	$17,421.56
PROJECT ENGINEERING COST:	$136,548.48
CONSTRUCTION COST:	$106,383.55

PERCENTAGE ENGINEERING FEES TO CONSTRUCTION COST:

DESIGN ENGINEERING/CONSTRUCTION COST	111.98%
CONSTRUCTION ENGINEERING/CONSTRUCTION COST	16.38%
TOTAL ENGINEERING COST/CONSTRUCTION COST	128.35%

REMARKS: Services provided by Spectrum Engineering included inventory, planning, bid document preparation, contract administration, quantity accounting, full time construction inspection and final report preparation and project close-out. Expenditures for site characterization, sampling and shaft probing included: (1) $21,261.25 for laboratory analysis; (2) $8,795.58 for investigations to characterize the available fill material and to evaluated potential groundwater impacts associated with using waste rock from adjacent dumps as backfill; and, (3) $12,139.50 for equipment rental for shaft probing. The cost for engineering also includes preparation of a Health and Safety Plan, a Sampling and Analysis Plan, a Report of Investigations, and designs for several sites that were dropped from the bid package. Shaft and pit probing investigations contemporaneously mitigated hazards at 19 individual sites

ATTACHMENT 5

CONSTRUCTION BID PACKAGE DRAWINGS

WEST BUTTE HMO PROJECT

DSL/AMRB 94-009

SILVER BOW COUNTY, MONTANA

PREPARED FOR:
MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

LAND AND MINERAL OWNERS
Group - 1 Sites

Butte Precious Metals
321 West Park St
Butte, MT 59701

Arch Dudden
2417 Yale Av.
Butte, MT 59701
406-723-5802

West Butte Metals
P.O. Box 605
Butte, MT 59703

Eric Nelson
2106 Duncan Dr.
Missoula, MT 59801
406-728-7952

Robert & Lillian Field
7756 E. Third
Scottsdale, AZ 85251

Margaret Thomas
1620 43rd Ave. E., #3A
Seattle, WA 98112

LAND AND MINERAL OWNERS
Group - 2 Sites

R.W. Richter and R.H. Kearney
RFD #2, P.O. Box 235
Butte, MT 59701
406-792-6286

Robert Evan Keeling
1275 Royal Birkdale Court
Rockledge, Fl 32955
407-639-1371

LAND AND MINERAL OWNER
Group - 3 Sites

North Butte Mining Co.
P.O. Box 188
Butte, MT 59703

SITE AND VICINITY MAP
USGS 7.5 MIN QUADS - BUTTE NORTH & BUTTE SOUTH

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HAZARD NOTICE

MANY POTENTIAL HAZARDS EXIST IN THE PROJECT AREA. THE EXTENT OF THESE HAZARDS IS NOT FULLY KNOWN. THE CONTRACTOR, SUBCONTRACTORS, AND THEIR EMPLOYEES WILL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS IN THE PERFORMANCE OF THE REQUIRED WORK. CONTRACTORS AND OTHER PERSONS WORKING ON THIS PROJECT SHALL BE FULLY RESPONSIBLE FOR APPRISING THEMSELVES OF ANY HAZARDOUS CONDITIONS WHICH MAY EXIST AND SHALL TAKE WHATEVER STEPS ARE NECESSARY TO INSURE THEIR SAFETY AND THE SAFETY OF OTHERS WHILE PERFORMING THEIR DUTIES.

SITE PLAN AND GENERAL LAYOUT

COVER SHEET

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE October 1994
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APPROVED BY DM
REVISIONS
NO DATE BY

SHEET NO 1 of 20

SITE PLAN AND GENERAL LAYOUT

ACCESS MAP

SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
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Billings, Montana 59101
Phone 406-259-2412

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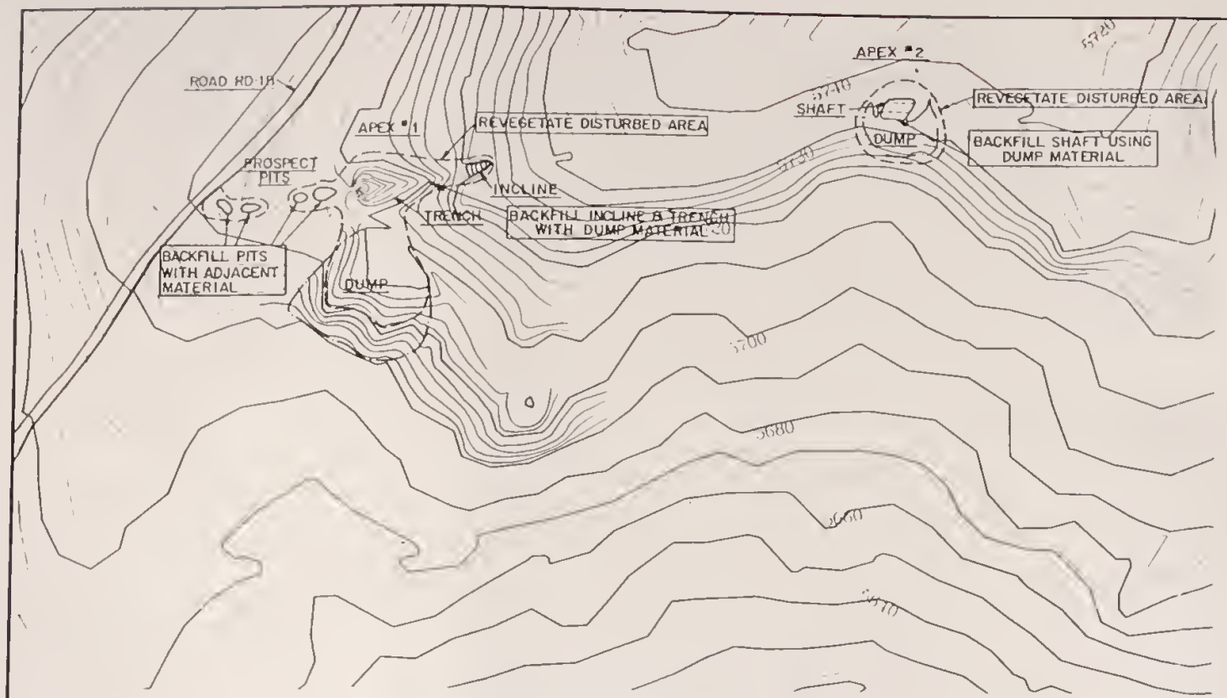
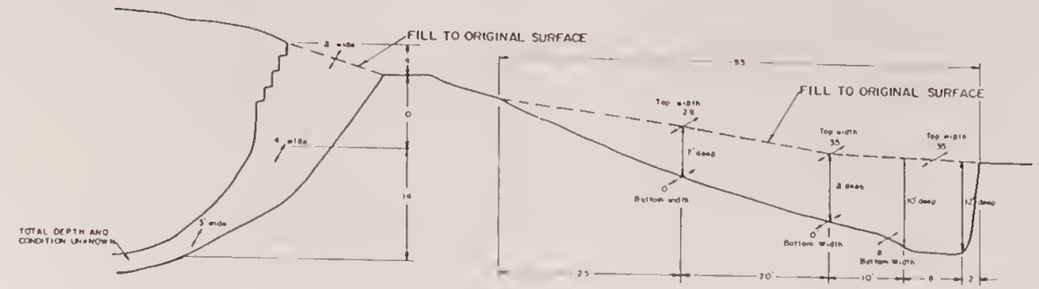
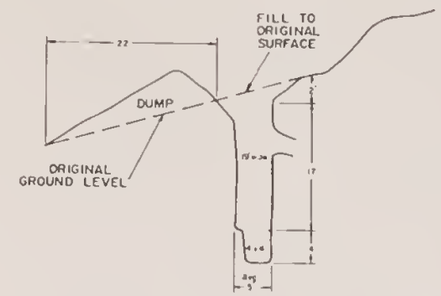


PLAN VIEW OF APEX SITE



CROSS SECTION THROUGH APEX #1 INCLINE & TRENCH LOOKING SOUTH



CROSS SECTION THROUGH APEX #2 SHAFT LOOKING WEST

View of shallow prospect pits with their associated dumps.

View of Apex #1 trench.

Looking across Apex #1 incline, trench and pit toward the access road.

View of Apex #2 shaft.

View of Apex #1 showing dump, trench & incline.

Looking into the Apex #1 incline.

APEX SITE WORK DESCRIPTION

Backfill Mine Openings - The Apex #1 inclined shaft, trench and four pits will be backfilled to the surface using material from the dump which is less than 100 feet away. It is estimated that the inclined shaft will require 60 cubic-yards of backfill, the trench will require 280 cubic-yards of backfill, and the four prospect pits will require 15 cubic-yards of backfill. All backfill surfaces will be graded to blend with the surrounding contours. Areas on the dump which are disturbed for borrow excavation will be regraded with maximum 2H 1V slopes.

The Apex #2 shaft will be backfilled to the surface using material from the associated dump and from the adjacent area. It is estimated that this vertical shaft will require 75 cubic-yards of backfill. The entire dump will be used in this operation. The area disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes should not exceed 2½H 1V.

Seed and Fertilize - The disturbed areas will be seeded and fertilized. Approximately 0.23 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. It is estimated that 11.0 pounds of Pure-Live-Seed and 21.3 pounds of fertilizer will be required.

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS
321 W. PARK ST.
BUTTE, MT 59701

ARCH DUDDEN
2417 YALE ST.
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PHONE 406-723-5802

SITE PLAN AND GENERAL LAYOUT

APEX SITE

NW 1/4 OF SECTION 15 T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
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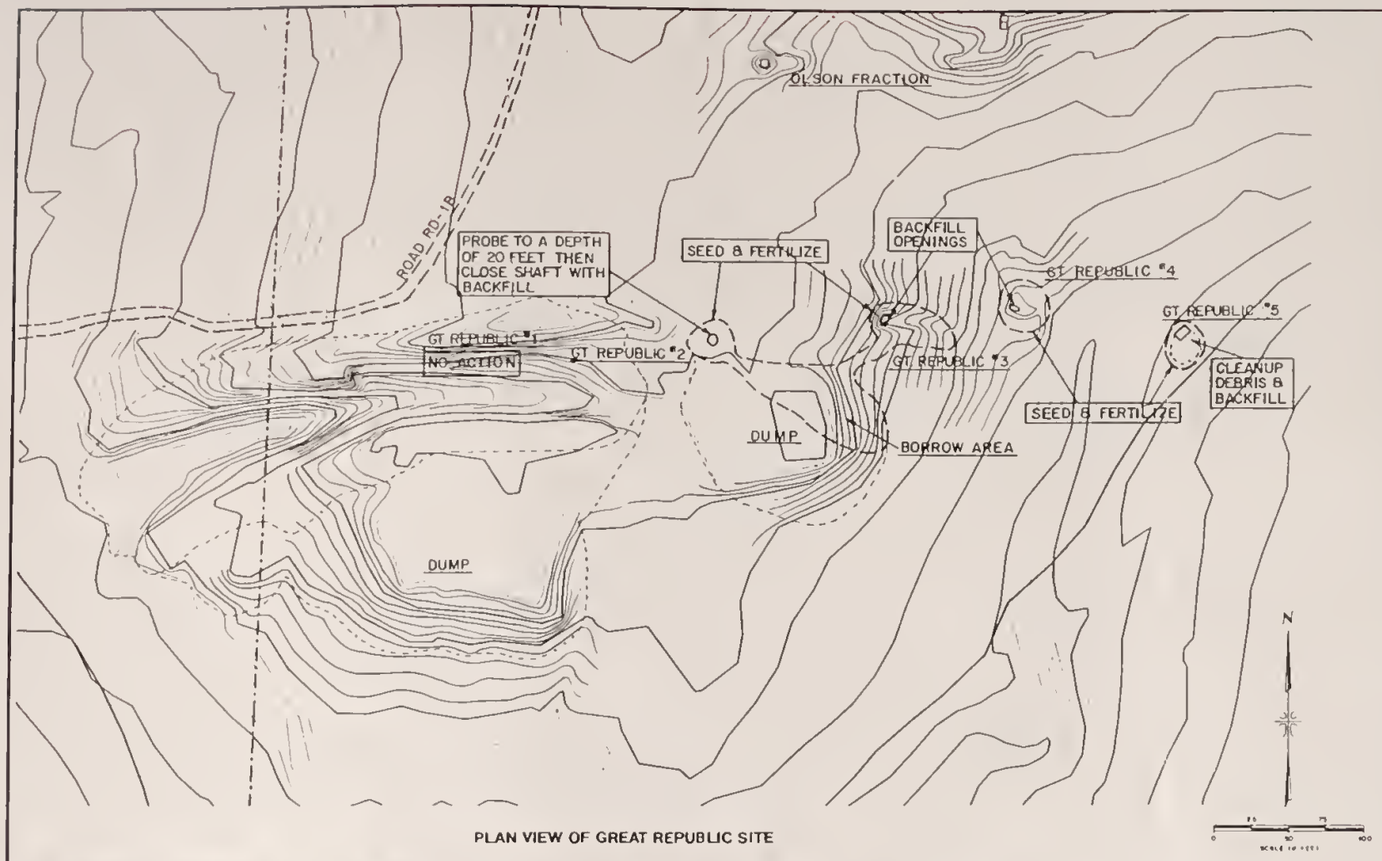


PLAN VIEW OF GREAT REPUBLIC SITE

GREAT REPUBLIC WORK DESCRIPTIONS

Backfill Mine Openings - The Great Republic #2 shaft will be backfilled using material from the nearby dump. Backfill will be mounded approximately 3-feet high over the opening. The area disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes on the backfill mound should not exceed 3H:1V. Areas on the dump which are disturbed by borrow excavation will be regraded with maximum 2H:1V slopes. Prior to backfilling, the shaft will be probed to a minimum depth of 20-feet. With anticipated additional induced subsidence produced by the probing operation, it is estimated that the total backfill quantity will be approximately 40 cubic-yards.

The Great Republic #3 cut and adit will be backfilled to the surface using material from the nearby dump. The backfill surface will be graded to blend with the surrounding contours. It is estimated that this opening will require 90 cubic-yards of backfill.

The incline at the Great Republic #4 will be completely backfilled. The surface excavation associated with the incline will then be filled and graded as a large mound cresting approximately 3 feet above the natural ground surface. Slopes on the backfill area will be 3H:1V or less. The immediate area will be graded and contoured as necessary to carry surface drainage around the backfilled area while maintaining a smooth drainage profile. Material from the adjacent dump and from the nearby dump located to the west will be used for backfill. Backfill requirements are estimated at 20 cubic-yards to fill the underground opening plus 40 cubic-yards to backfill and grade the surface cut. Areas on the dumps which are disturbed by borrow excavation will be regraded with maximum 2H:1V slopes.

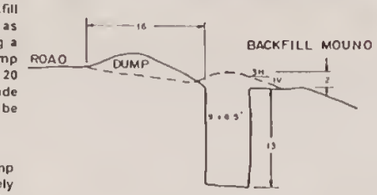
The Great Republic #5 shaft will be backfilled by using material from the adjacent dump and by borrowing from the surrounding area. Backfill will be mounded approximately 2-feet high over the opening. It is estimated that this opening will require 35 cubic-yards of backfill. The entire adjacent dump will be placed in the opening. The area disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes on the backfill mound and borrow area should not exceed 3H:1V.

Probe Mine Openings - Prior to backfilling the Great Republic #2 shaft, this opening will be probed to a depth of 20 feet below the collar. Probing the opening will be accomplished by digging out the material which has caved or otherwise collected in the underground opening. A backhoe or other equipment capable of probing the opening to a minimum depth of 20-feet will be used in this operation.

Debris Cleanup - Prior to backfilling the Great Republic #5 shaft, trash in the opening will be removed so any drifting at the bottom of the opening can be filled. Nonbiodegradable trash will be crushed and buried in the opening. Wood may be disposed of by burning and dumping the ashes back into the opening. However, the Contractor may select to haul the debris in the shaft to the local landfill.

Seed and Fertilize - The areas disturbed by construction will be seeded and fertilized. Approximately 0.16 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. It is estimated that 7.7 pounds of Pure-Live-Seed and 14.8 pounds of fertilizer will be required. After application, the reseeded area will be tracked. Raking may be substituted in areas that cannot be tracked. Seed certifications and documentation of the seed mix must be submitted for approval prior to application.

View of the Great Republic #5 dump.

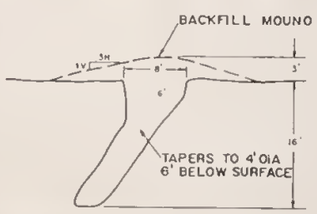


CROSS SECTION THROUGH GREAT REPUBLIC #5

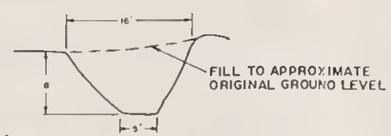
Great Republic #5 – Remove debris from shaft and backfill with 2' high mound.

Great Republic #2 – Water flood the opening to induce additional subsidence. Then backfill with 3' high mound over the shaft.

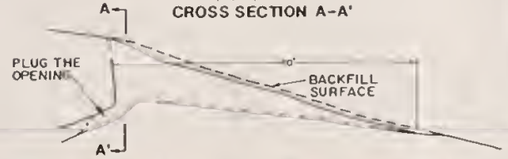
Great Republic #3 – Use material from nearby mine dumps to completely backfill.



CROSS SECTION THROUGH GREAT REPUBLIC #2



CROSS SECTION A–A'



LONGITUDINAL SECTION OF GREAT REPUBLIC #3

Great Republic #4 – Backfill 13'x4'x15' deep inclined shaft located inside surface cut. Then use material from nearby dumps to backfill surface cut with a 3 foot high mound. Grade to carry surface drainage around backfilled area.

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS, INC.
321 W. PARK STREET
BUTTE, MT 59701

SITE PLAN AND GENERAL LAYOUT

GREAT REPUBLIC SITE

NW1/4 OF SEC 15 & NE1/4 OF SEC 16, T3N R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

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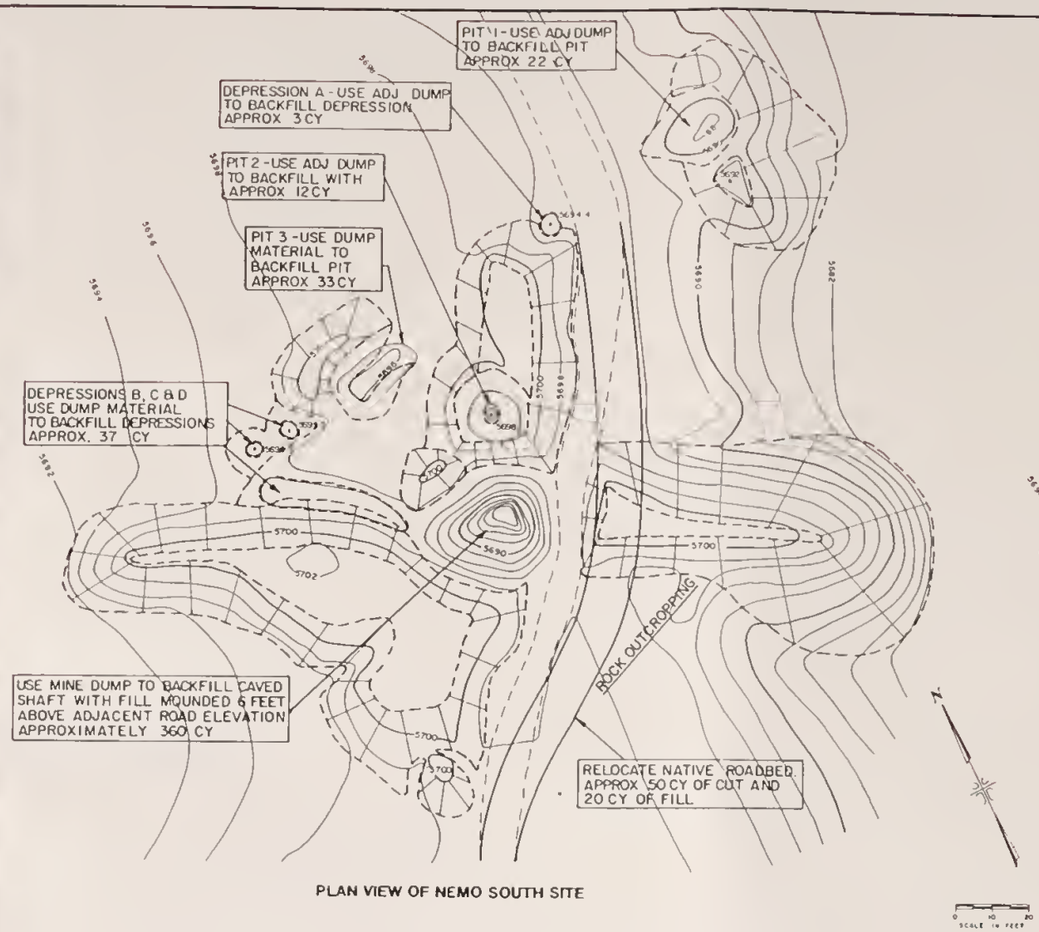
View looking east across site

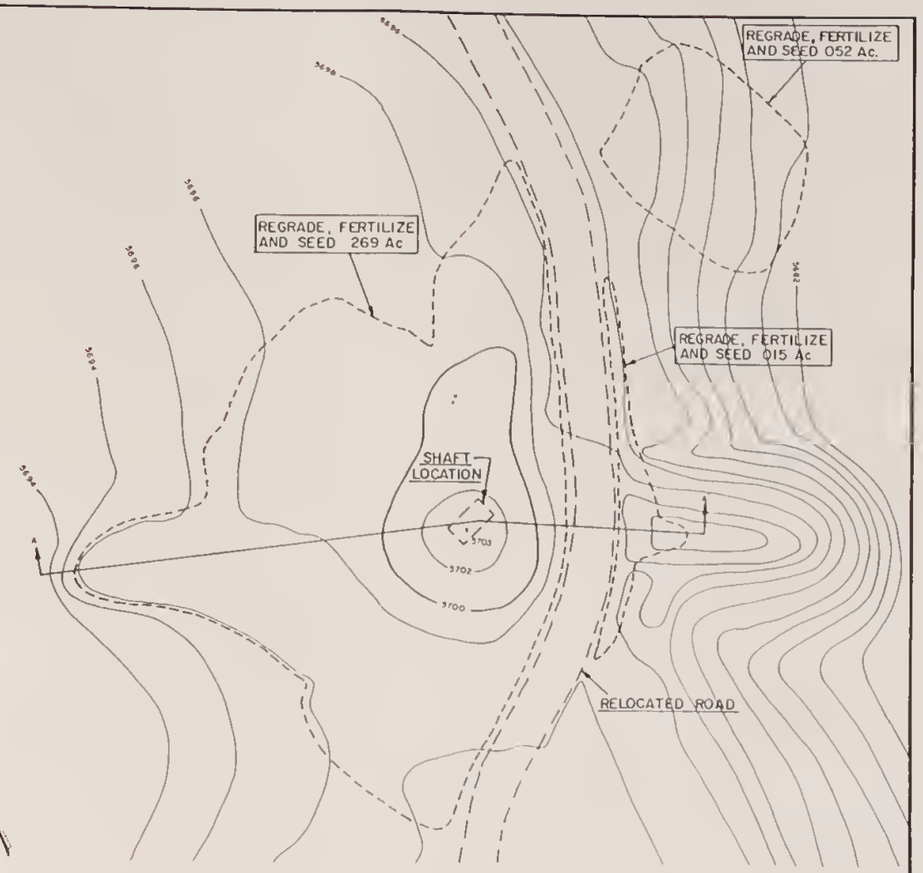
View of caved shaft, west dump borrow area and Depressions 'C' and 'D'.

Debris in bottom of shaft will be removed and haulad to landfill.

View of large dump on east side of road and north end of road relocation area.



PLAN VIEW OF NEMO SOUTH SITE



SITE GRADING PLAN

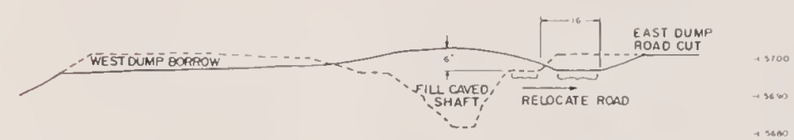
NEMO SOUTH SITE WORK DESCRIPTION

Debris Cleanup - Prior to backfilling the caved shaft, trash in the bottom of the subsidence depression must be removed and hauled to the county landfill. There is about one cubic-yard of debris

Backfill Mine Openings - The Nemo South caved shaft will be backfilled using approximately 360 cubic-yards of fill from the adjacent dumps. Backfill over the shaft will be mounded approximately 6-feet above the elevation on the adjacent road. In addition, seven (7) pits or depressions on the site will be backfilled to the surface using material from the adjacent or nearby dumps It is estimated that Pit-1 will require 22 cubic-yards of backfill, Pit-2 will require 12 cubic-yards of backfill, Pit-3 will require 33 cubic-yards of backfill; and Depressions A, B, C, and D will require a total of 40 cubic-yards of backfill. The location of each of these features is shown on the Site Topography As indicated on the Site Grading Plan, disturbance of the large dump on the east side of the road will be limited to approximately 50 cubic-yards of excavation which is required for relocation of the road All other dumps will be either totally or partially consumed for borrow. All areas disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes on the dump and the backfill mound should not exceed 2½H 1V Site grading will reasonably conform with the line and grades shown on the Site Grading Plan and the Cross-Section Through the Shaft Backfill Mound and Road Relocation Area It is estimated that the backfill operation will require the regrading of 0.321 acres

Road Relocation - As shown on the Plan View and the Cross-Section Through the Shaft Backfill Mound and Road Relocation Area, the edge of the backfill mound is expected to encroach upon a portion of the existing site access road Consequently 150-feet of this road will be relocated east of it's present location The present road is an unsurfaced one-lane trail. The relocated section of road will be 12-feet wide and will be constructed on fill from the dump on the east side of the current road it is estimated that there will be 50 cubic-yards of cut along the edge of the dump and around 20 cubic yards of fill Cut slopes will be graded at 3H 1V and fill slopes will be graded at 2H 1V The road profile in the relocated section will maintain a reasonably constant grade along it's entire length

Seed and Fertilize - All disturbed areas except the running surface on the road will be seeded and fertilized Approximately 0 34 acres will need to be reseeded Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre Fertilizer will be spread over the reseeded area at the rate of 92 5 pounds of nutrients per acre It is estimated that 16.3 pounds of Pure-Live-Seed and 31 5 pounds of fertilizer will be required



CROSS SECTION THROUGH SHAFT BACKFILL MOUND AND ROAD RELOCATION AREA

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS
321 W. PARK STREET
BUTTE, MT 59701

SITE PLAN AND GENERAL LAYOUT

NEMO SOUTH SITE

SE 1/4 OF SECTION 9 T3N R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
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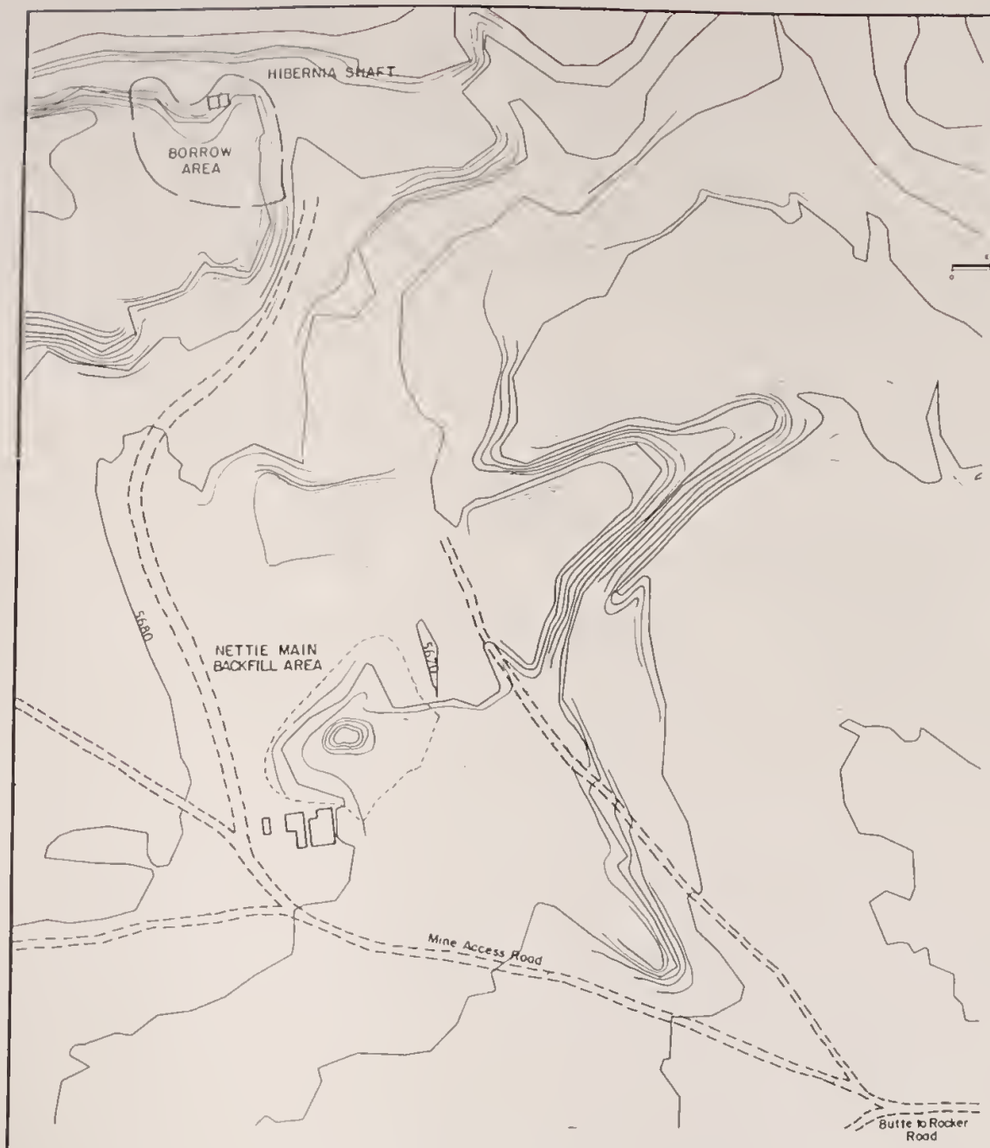
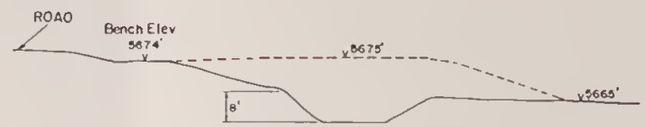


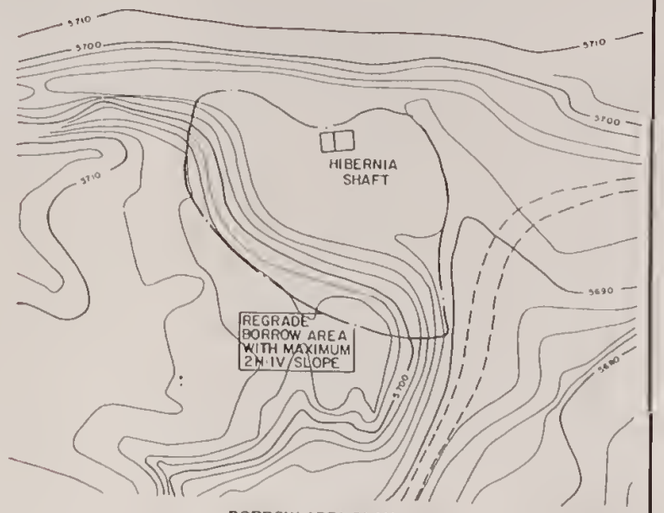
PLAN VIEW OF NETTIE MAIN SITE

LAND & MINERAL OWNERSHIP

WEST BUTTE METALS, INC.
P.O. BOX 605
BUTTE, MT 59703



CROSS SECTION THROUGH NETTIE MAIN FILL



BORROW AREA PLAN

BACKFILL GRADING PLAN

Looking north across caved shaft toward borrow area

Looking southwest at backfill area around collapsed shaft.

NETTIE MAIN SITE WORK DESCRIPTION

Backfill Mine Openings - The Nettie Main shaft will be backfilled using material from the northeast corner of the Hibernia dump. The backfill will be mounded 10-feet above the dump elevation on the southeast side of the shaft and about 1-feet above the existing ground elevation of the bench on the northwest side of the shaft as shown on the Cross-Section Through the Nettie Main Fill. Approximately 1600 cubic-yards of backfill will be required. All backfill surfaces will be graded to blend with the surrounding contours with slopes not exceeding 3H:1V. The final graded surface will conform reasonably closely with the grades and contours shown on the Backfill Grading Plan. It is estimated that 0.16 acres in the borrow area will be graded with maximum 2H:1V slopes. The final grades for the borrow area are shown on the Borrow Area Plan. The unit price bid for backfilling will include all excavation and haulage of backfill material from the Hibernia Dump, access development, dust suppression, and borrow area grading.

Seed and Fertilize - Borrow area seeding will not be required. However, the backfill area which is estimated to contain approximately 0.23 acres will be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. It is estimated that 11.0 pounds of Pure-Live-Seed and 21.3 pounds of fertilizer will be required. After application, the reseeded area will be tracked. Raking may be substituted in areas that cannot be tracked. Seed certifications and documentation of the seed mix must be submitted for approval prior to application.

SITE PLAN AND GENERAL LAYOUT

NETTIE MAIN SITE

NE 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

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Billings, Montana 59101
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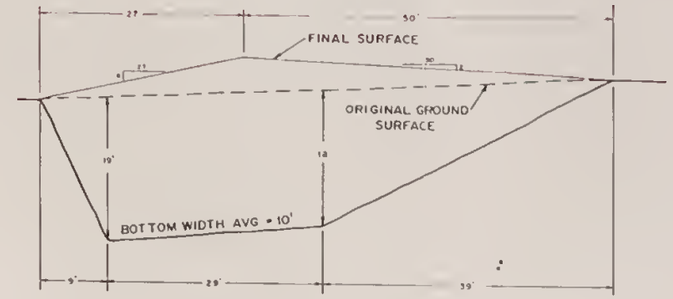
PLAN VIEW OF NETTIE INCLINE SITE



CROSS SECTION OF NETTIE INCLINE SITE

SCALE IN FEET

NETTIE INCLINE SITE WORK DESCRIPTION

Backfill Mine Openings - The subsidence depression associated with the caved Nettie Incline will be backfilled using material from the borrow area indicated on the adjacent dump. The backfill will be mounded over the opening and will be graded to provide positive drainage in all directions as shown on the cross-section. It is estimated that the depression and mound will require 1400 cubic-yards of backfill. All disturbed surfaces will be graded to blend with the surrounding contours. Areas on the dump which are disturbed for borrow will be regraded with maximum 2½ H 1 V slopes.

Seed and Fertilize - The disturbed areas will be seeded and fertilized. Approximately 0.53 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. It is estimated that 25.4 pounds of Pure-Live-Seed and 49.0 pounds of fertilizer will be required.

View of dump and depression.

Close up view of subsidence depression.
Concrete will be buried in place.

LAND & MINERAL OWNERSHIP

WEST BUTTE METALS, INC.
P.O. BOX 605
BUTTE, MT 59703

SITE PLAN AND GENERAL LAYOUT

NETTIE INCLINE SITE

NW 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

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Billings, Montana 59101
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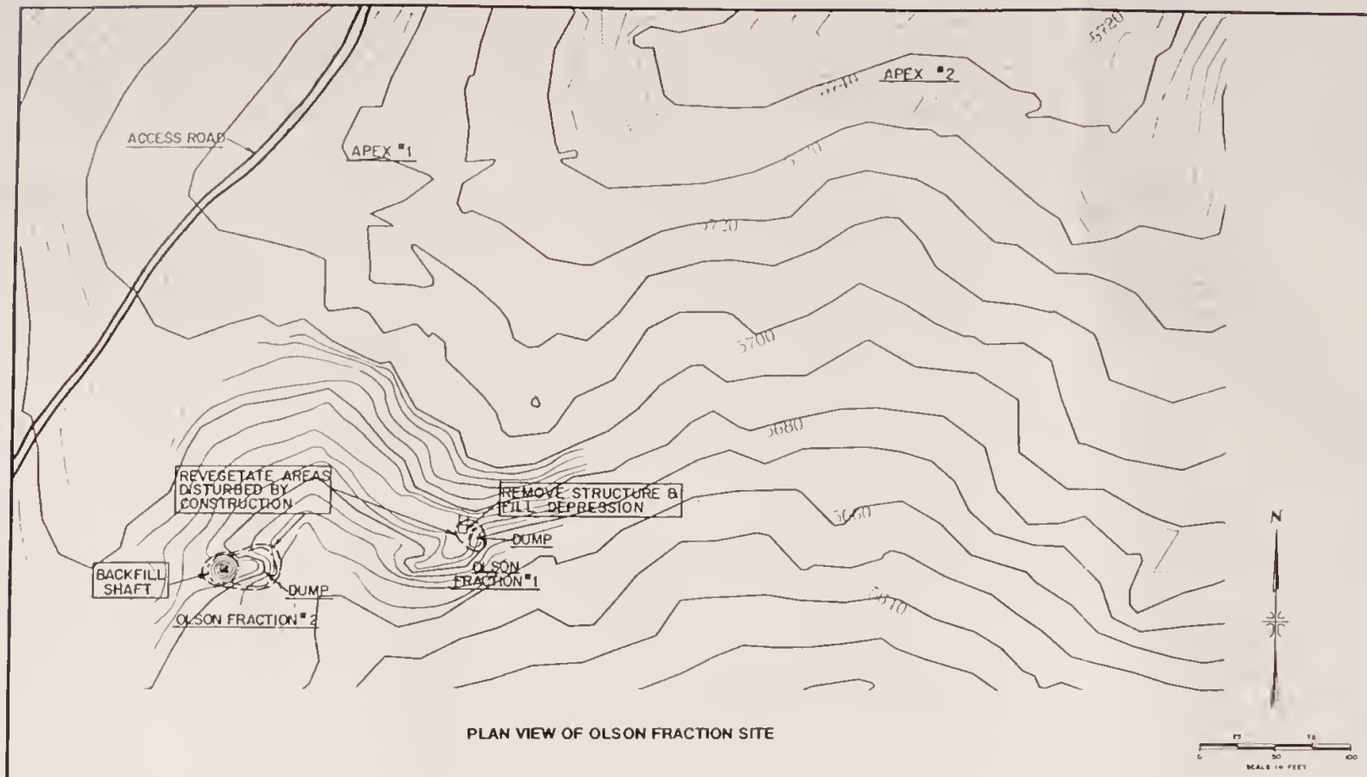
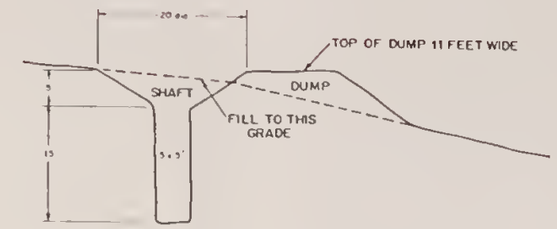


PLAN VIEW OF OLSON FRACTION SITE



CROSS SECTION THROUGH OLSON FRACTION #2

SCALE IN FEET

OLSON FRACTION SITE WORK DESCRIPTION

Structure Removal - The structure at the Olson Fraction #1 will be completely dismantled and removed from the site. The dismantled structure will be hauled to the local landfill. The structure consists of two 10 foot long 10" X 10" timbers supported by four posts. There is a 4' x 4' room at one end that is enclosed with lagging and tin. The dismantled structure will generate about 3 cubic-yards of debris.

Backfill Mine Openings - The Olson Fraction #1 opening will be backfilled to the surface with material from the adjacent mine dump. It is estimated that this opening will require 7 cubic-yards of backfill. The area disturbed by construction will be regraded to blend with the surrounding contours. The entire dump on the downhill side of the opening should be consumed in this operation. All regraded areas will be contoured with maximum 2½H:1V slopes.

The Olson Fraction #2 shaft will be backfilled to the surface with material from the adjacent mine dump. It is estimated that this opening will require 35 cubic-yards of backfill. The area disturbed by construction will be regraded to blend with the surrounding contours. The entire dump associated with the opening will be consumed in this operation. All regraded areas will be contoured with maximum 3H:1V slopes.

Seed and Fertilize - The disturbed areas will be seeded and fertilized. Approximately 0.03 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. It is estimated that 1.5 pounds of Pure-Live-Seed and 2.8 pounds of fertilizer will be required.

View of Olson Fraction #2. Use entire dump to backfill 20 foot deep shaft.

View of Olson Fraction #1. Dismantle & remove the structure. Fill 7 cubic yard depression below structure.

LAND & MINERAL OWNERSHIP

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BUTTE, MT 59701

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MISSOULA, MT 59801
406-728-7952

ROBERT & LILLIAN FIELD
7756 E. THIRD
SCOTTSDALE, AZ 85251

SITE PLAN AND GENERAL LAYOUT

OLSON FRACTION SITE

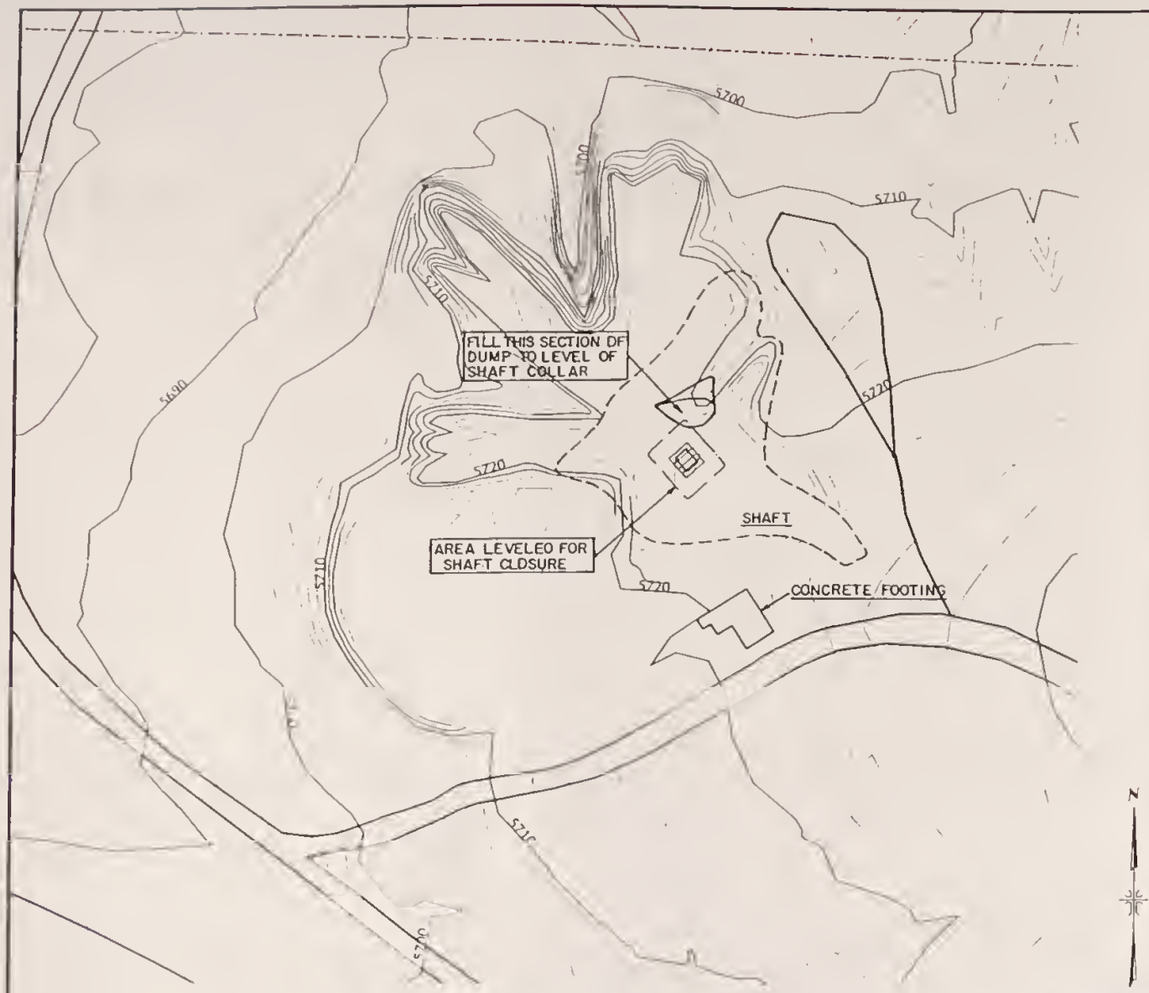
NW 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

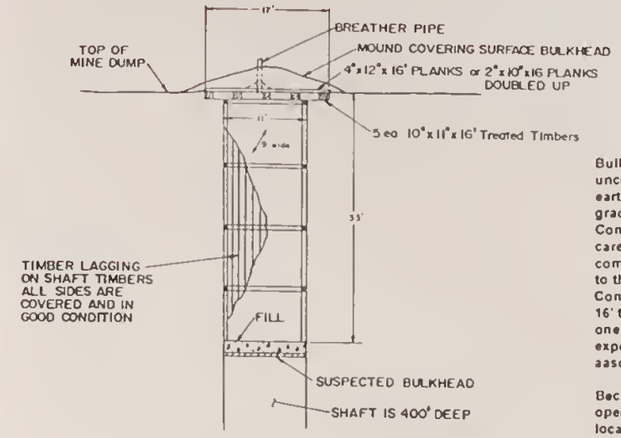
SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE September 1994
DRAWN BY DLO
APPROVED BY DM
REVISIONS
NO. DATE BY

SHEET NO. 8 of 20

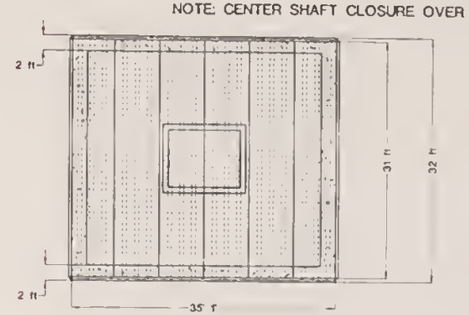


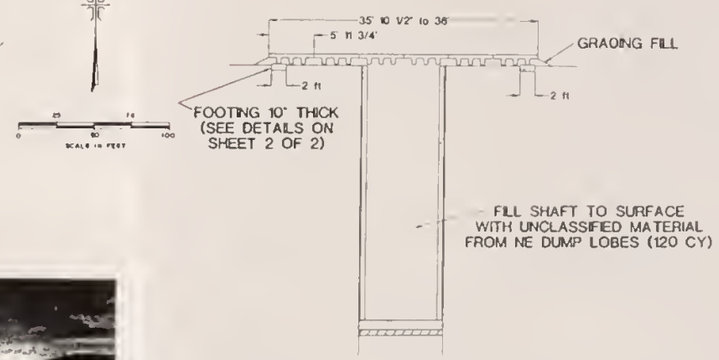
PLAN VIEW OF PLUTUS SITE



CROSS SECTION SHOWING PRE-CONSTRUCTION

NOTE: CENTER SHAFT CLOSURE OVER SHAFT





SHAFT CLOSURE SECTION THROUGH LONG AXIS OF SHAFT

PLUTUS SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - The surface bulkhead on the Plutus shaft will be uncovered, dismantled, and removed from the site. Approximately 6 cubic-yards of earth which has been mounded over the bulkhead will be excavated and used as grading fill. The bulkhead is 16' x 17' and is constructed as indicated on the Pre-Construction Cross-Section. It will be completely dismantled. During this operation care will be taken to preserve the shaft collar and to avoid dropping bulkhead components into the shaft. All debris from this operation must be collected and hauled to the local landfill unless components are salvaged and removed from the site by the Contractor. It is estimated that the bulkhead debris will consist of five (5) 10" x 11" x 16' treated timbers, eight (8) 4" x 12" x 17' planks, twenty (20) 2" x 10" x 17' planks, and one (1) 6' x 6" dia. pipe. After the shaft has been uncovered, the Contractor at his expense will take all appropriate measures to protect the public from all hazards associated with the open shaft.

Backfill Mine Opening - The Plutus shaft is blocked 33-feet below the surface. The opening will be backfilled to the surface with material excavated from the dump lobes located northeast of the shaft. In addition, an area between the two dump lobes will be filled to the collar elevation of the shaft and recontoured to blend with the adjacent borrow areas on the dump. It is estimated that the shaft will require 120 cubic-yards and the fill area on the dump will require 40 cubic-yards of backfill. If the fill subsides inside the shaft during this operation, the backfill requirements will be increased. Areas on the dump which are disturbed by borrow excavation will be regraded with maximum 2½H:1V slopes after the Tri-deck beam shaft closure has been completed.

Tri-Deck Beam Shaft Closure - The Contractor will install a 31' x 36' shaft cover using 6 prestressed Tri-Deck concrete beams conforming with AASHTO HS20 loading (intermediate bridge sections). The installation will conform to all requirements in the Special Technical Specification for Tri-Deck Beam Shaft Closure (in Section III) and on the Site Plan Drawing. Work elements are as follows:

(1) Level a 32 ft x 36 ft area surrounding the shaft at the collar elevation. Approximately 20 cubic yards of cut and fill work.

(2) Excavate for footings (approx. 7 CY) and install forms for 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1½". The footing will be level and will be installed with the bottom 8-inches below grade.

(3) Construct reinforced concrete footing to level and support Tri-Deck Beams. Approximately 7.8 cubic-yards of 3000 PSI concrete will be required. Longitudinal reinforcement will consist of 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Additional reinforcement will be provided at all corners with #5 - 20" x 20" corner bars matched to the longitudinal reinforcement. Reinforcement will require approx. 600' of #5 bar, 150' of #3 bar, and 16 ea. #5 bar corners.

(4) Improve access as required to deliver beams.

(5) Furnish, deliver and install Tri-Deck Beams. Each beam will be 31 feet in length, 1' 4" in depth, and approximately 6 feet wide. Each beam will weigh approximately 21,000 pounds. The precast Tri-Deck beams will be laid edge to edge on the concrete footing and fastened in-place. Precast endwalls will be installed at the ends of each beam. See details on Sheet 2 of 2.

(6) Backfill (approx. 8 CY) around shaft closure to provide a 2H 1V slope.

Seed and Fertilize - All areas around the shaft closure which have been disturbed by construction (approx. 0.38 acres) will be seeded and fertilized. Utilize broadcast seeding rate of 48 lbs. of PLS/Ac (approx. 18.2 lbs.) and spread fertilizer at the rate of 92.6 lbs/Ac (approx. 35.2 lbs). After application, the reseeded area will be tracked or raked.

Approach to Plutus dump & shaft.

View showing existing timber bulkhead.

Earth mound placed over timber bulkhead after the inspection.

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS
321 W. PARK ST.
BUTTE, MT 59701

ERIC NELSON
2106 DUCAN DR.
MISSOULA, MT
406-728-7952

MARGARET THOMAS
1620 43rd AVE. E, #3A
SEATTLE, WA 98112

SITE PLAN AND GENERAL LAYOUT

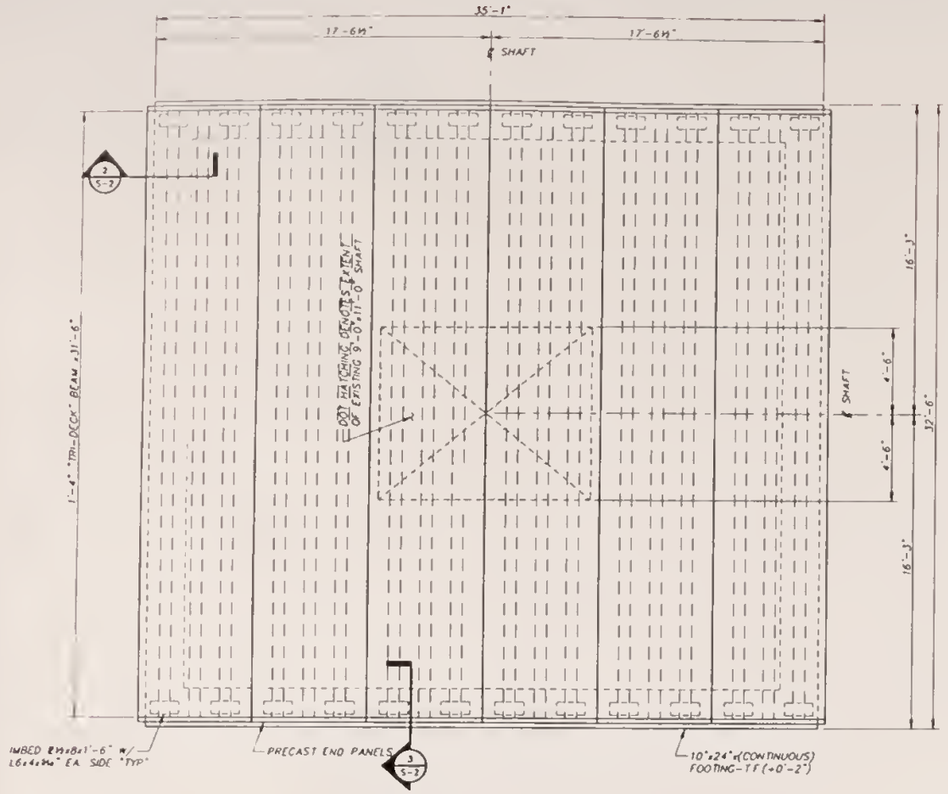
PLUTUS SITE
(1 OF 2)
NE 1/4 SECTION 15, T3N, R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

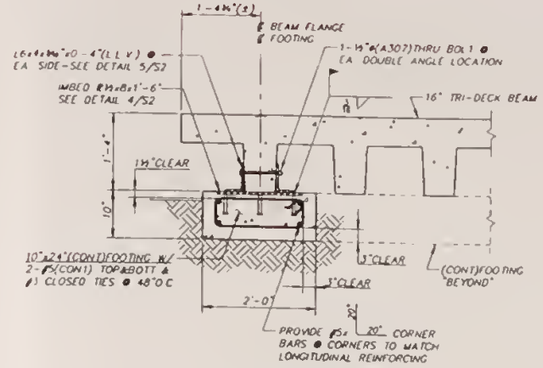
DATE September 1994
DRAWN BY DLD
APPROVED BY DBJ
REVISIONS
NO. DATE BY

SHEET NO 9 of 20



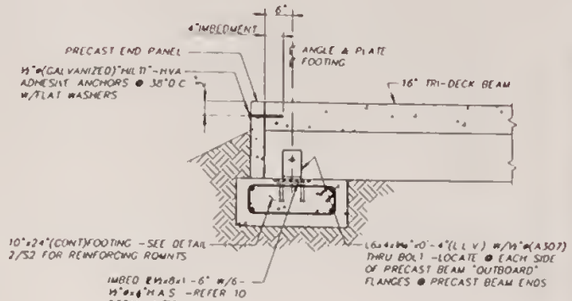
1 S-2 PLAN • SHAFT COVER

INCHES 0 12 24 48 96



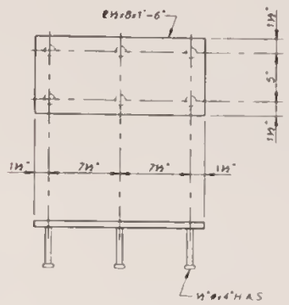
2 S-2 SECTION

INCHES 0 4 8 16



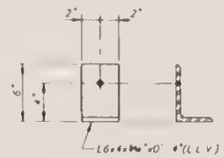
3 S-2 SECTION

INCHES 0 4 8 16



4 S-2 DETAIL

NOT TO SCALE



5 S-2 DETAIL

NOT TO SCALE

STRUCTURAL NOTES

1 DESIGN CRITERIA

PRECAST CONCRETE — DESIGN LOAD = 100 PSF

2 MATERIALS

STEEL SHAPES & PLATES (BLACK)	ASTM A36, F_y = 36KSI
WELDED CONNECTIONS	E70XX ELECTRODES
BOLTED CONNECTIONS	ASTM A307 BOLTS
CONCRETE	3000 PSI AT 28 DAYS
PRECAST CONCRETE	5000 PSI AT 28 DAYS
REINFORCING STEEL BARS	
#4 THRU #10 BARS	ASTM A615 - GRADE 60
#2 & #3 BARS	ASTM A615 - GRADE 40

3 FOOTING NOTES

1 ALL FOOTINGS ARE ASSUMED TO BEAR ON NATIVE SOILS. IF QUESTIONABLE SOILS ARE ENCOUNTERED -CONTRACTOR IS TO NOTIFY OWNER IMMEDIATELY
2 ALL COORDINATION OF FOOTINGS, IMBEDS, AND PRECAST UNITS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR

4 CONCRETE

1 ALL CONCRETE SHALL BE READY MIXED AND SUPPLIED IN ACCORDANCE WITH SPECIFICATION REQUIREMENTS. NO WATER SHALL BE ADDED TO MIX AT JOB SITE
2 MINIMUM COVER REQUIREMENTS
CAST AGAINST EARTH = 3"
FORMED WALLS = 1 1/2"

5 REINFORCING STEEL

1 MINIMUM LAP REQUIREMENTS 30 BAR DIAMETERS
2 CORNER BARS REQUIRED @ FOOTING LOCATIONS OF SIZE AND QUANTITY OF HORIZONTAL STEEL @ ALL CORNERS AND INTERSECTIONS

MONTANA WES KRIVONEN 7601E REGISTERED PROFESSIONAL ENGINEER

KRIVONEN ASSOCIATES, P.C.
STRUCTURAL CONSULTANTS

JOB NAME SHAFT COVER	DRAWN BY O.K.	ENGINEER W.K.	
LOCATION MONTANA	SCALE AS NOTED		
	DATE 3/27/95		
CONTRACTOR TO BE CHOSEN	JOB NUMBER	SHEET	
DESCRIPTION PLANS & DETAILS	484	S2 △	

SITE PLAN AND GENERAL LAYOUT

PLUTUS SITE

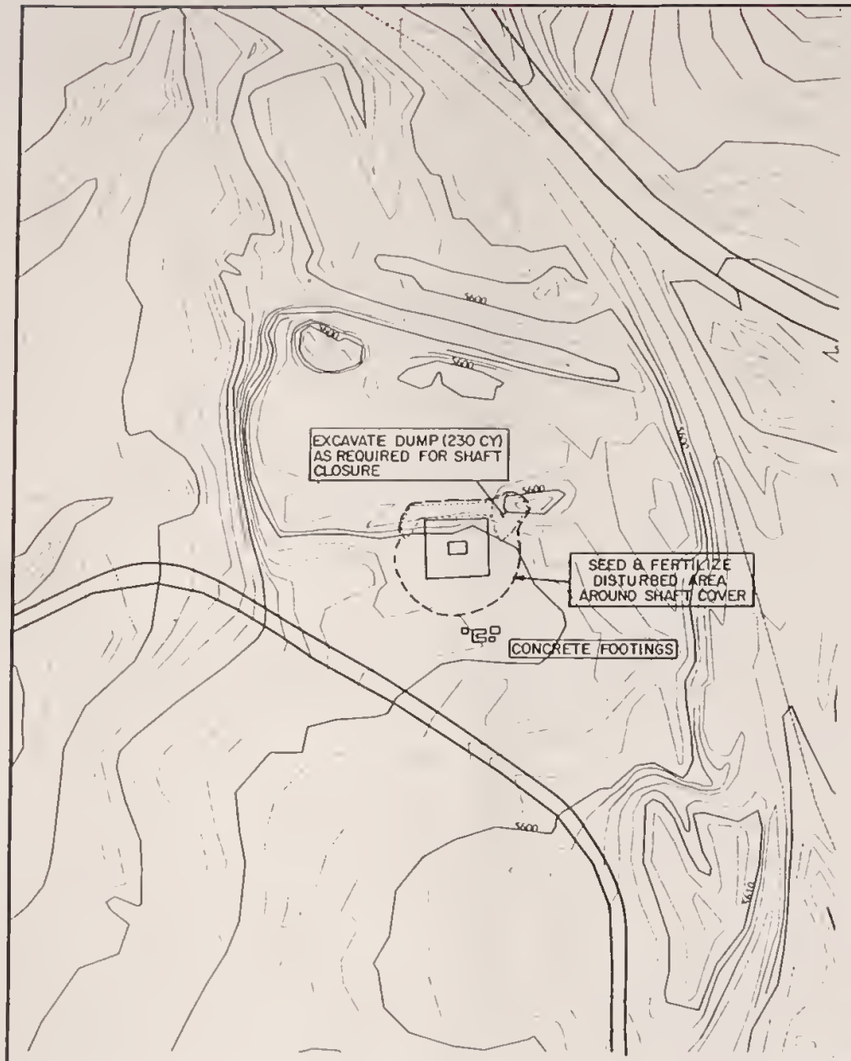
(2 OF 2)

NE 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

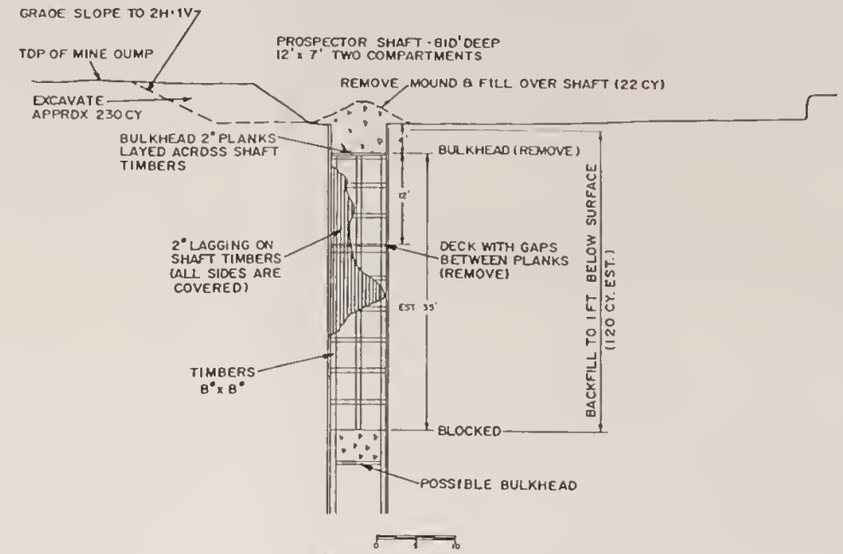
STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

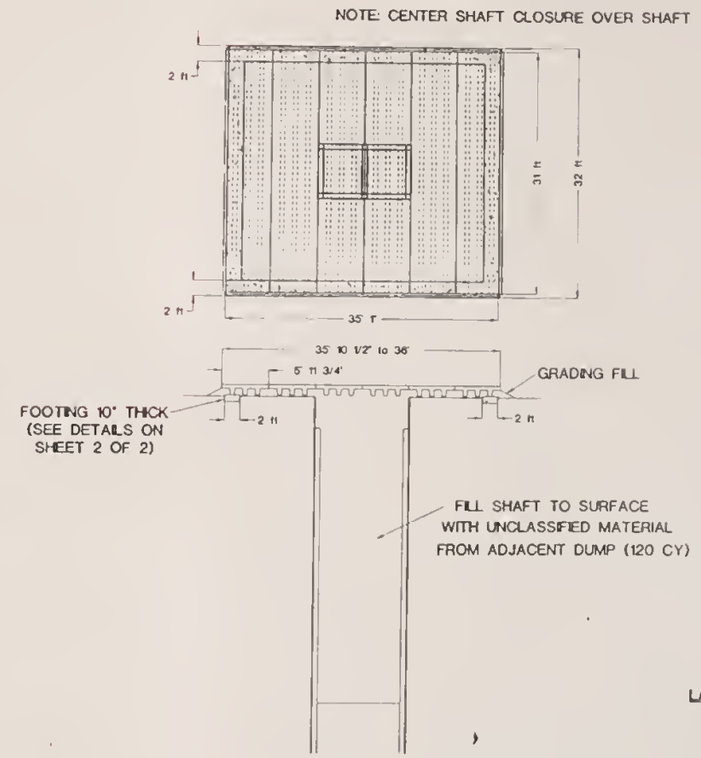
DATE	
DRAWN BY	
APPROVED BY	
REVISIONS NO.	DATE / BY
SHEET NO. 10 of 20	



PLAN VIEW OF PROSPECTOR SITE



PRE-CONSTRUCTION CROSS SECTION



SHAFT CLOSURE SECTION THROUGH LONG AXIS OF SHAFT

PROSPECTOR SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - Remove approximately 22 cubic-yards of earth which has been mounded over the bulkhead situated four feet below the surface. Then remove the first bulkhead which consists of 2-inch planks laid across the first intact set of horizontal timbers inside the 12' x 7' shaft. Next remove a second deck consisting of planks laid loosely across the horizontal timbers at about 16-feet below the surface. Finally, cut-off any lagging around the shaft that extends above the base elevation of the proposed cap. All debris from these operations must be collected and hauled to the local landfill unless salvaged and removed from the site. After the shaft has been uncovered, the Contractor at his expense will take all appropriate measures to protect the public from all hazards associated with the open shaft.

Backfill Mine Opening - The Prospector shaft appears to be blocked approximately 39-feet below the surface. The opening will be backfilled to the surface with approximately 120 cubic-yards of material from the adjacent dump. Because the shaft is situated about 6-feet from the toe of the dump, material that would interfere with the cover installation must be used for backfill. If the fill subsides inside the shaft during this operation, the backfill requirements will be increased.

Dump Excavation - Approximately 230 cubic-yards of material must be excavated from the dump in order to provide room for the Tri-deck beam shaft closure. Part of the dump will be utilized as a borrow source for backfilling the mine opening. Any material that cannot be utilized for shaft backfilling (approximately 110 cubic-yard of excavation) will be considered as dump excavation and will be added to existing piles on the dump or dumped along the outside slope of the dump. The excavated dump face along the Tri-deck beam shaft closure will be regraded with maximum 2H:1V slopes.

Tri-Deck Beam Shaft Closure - The Contractor will install a 31' x 36' shaft cover using 6 prestressed Tri-Deck concrete beams conforming with AASHTO HS20 loading (intermediate bridge sections). The installation will conform to all requirements in the Special Technical Specification for Tri-Deck Beam Shaft Closure (in Section III) and on the Site Plan Drawing. Work elements are as follows:

(1) Level a 32 ft x 36 ft area surrounding the shaft at the collar elevation. Approximately 20 cubic yards of cut and fill work.

(2) Excavate for footings (approx. 7 CY) and install forms for 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1⅓" . The footing will be level and will be installed with the bottom 8-inches below grade.

(3) Construct reinforced concrete footing to level and support Tri-Deck Beams. Approximately 7.8 cubic-yards of 3000 PSI concrete will be required. Longitudinal reinforcement will consist of 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Additional reinforcement will be provided at all corners with #5 - 20" x 20" corner bars matched to the longitudinal reinforcement. Reinforcement will require approx. 600' of #5 bar, 150' of #3 bar, and 16 ea. #5 bar corners

(4) Improve access as required to deliver beams.

(5) Furnish, deliver and install Tri-Deck Beams. Each beam will be 31 feet in length, 1' 4" in depth, and approximately 6 feet wide. Each beam will weigh approximately 21,000 pounds. The precast Tri-Deck beams will be laid edge to edge on the concrete footing and fastened in-place. Precast endwalls will be installed at the ends of each beam. See details on Sheet 2 of 2

(6) Backfill (approx. 8 CY) around shaft closure to provide a 2H:1V slope.

Seed and Fertilize - The excavated portion of the dump and all areas around the shaft closure which have been disturbed by construction (approx. 0.093 acres) will be seeded and fertilized. Utilize broadcast seeding rate of 48 lbs. of PLS/Ac (approx. 4.5 lbs.) and spread fertilizer at the rate of 92.5 lbs/Ac (approx. 8.6 lbs). After application, the reseeded area will be tracked or raked.

Shaft is located below the earth mound.

Shaft (12'x7') has a bulkhead made of 2" planks approximately 4' below the surface

LAND & MINERAL OWNERSHIP

WEST BUTTE METALS, INC.
P.O. BOX 605
BUTTE, MT 59703

SITE PLAN AND GENERAL LAYOUT

PROSPECTOR SITE

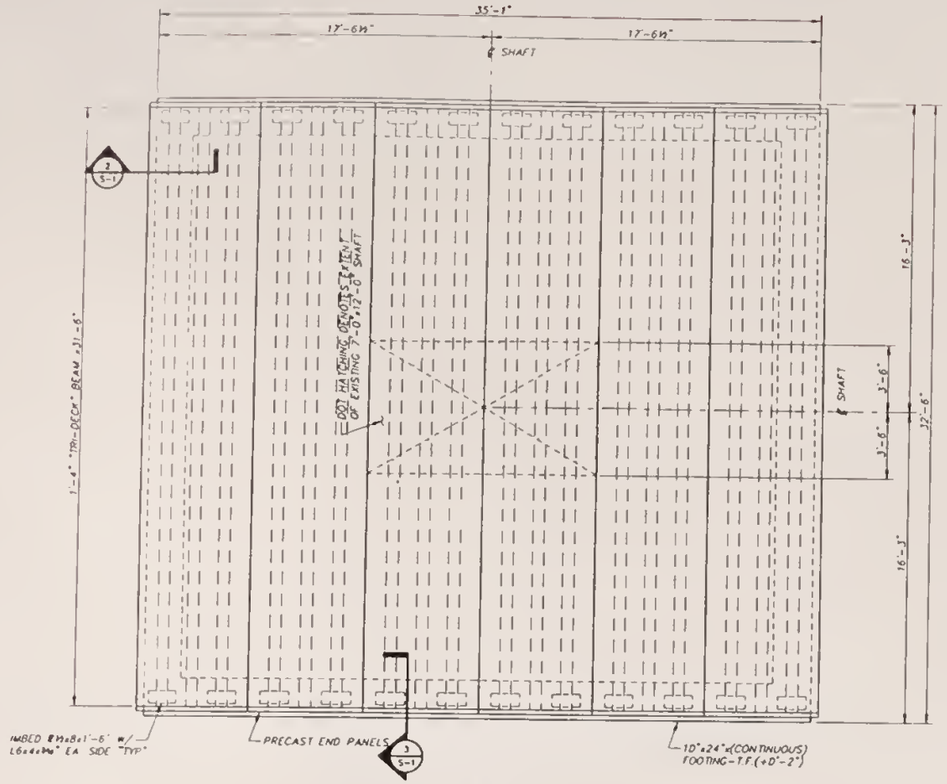
(1 OF 2)

NE 1/4 SE 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

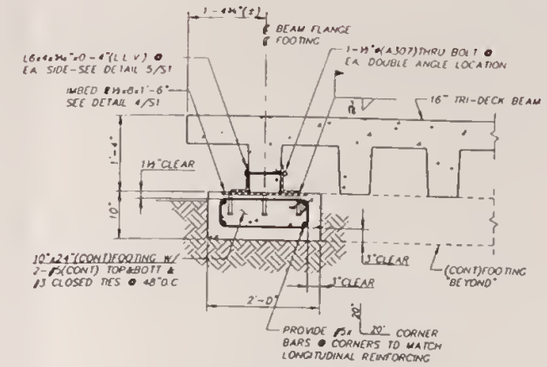
SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE	October 1994
DRAWN BY	DLD
APPROVED BY	DM
REVISIONS NO	DATE / BY
SHEET NO	11 of 20



1 S-1 PLAN • SHAFT COVER

INCHES 0 12 24 48 96



2 S-1 SECTION

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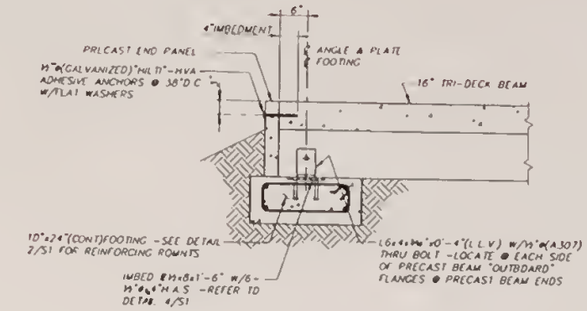
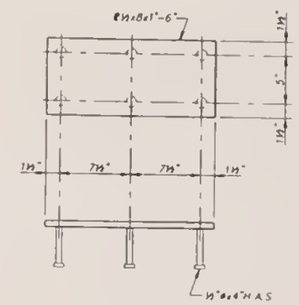
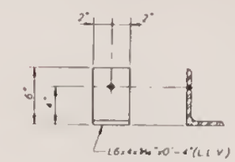


3 S-1 SECTION

INCHES 0 1 4 8 16



4 S-1 DETAIL
NOT TO SCALE



5 S-1 DETAIL
NOT TO SCALE

STRUCTURAL NOTES

1. DESIGN CRITERIA

   PRECAST CONCRETE .... DESIGN LOAD = 100 PSF

2. MATERIALS:

   STEEL SHAPES & PLATES (BLACK) ...ASTM A36, F_y = 36KSI
   WELDED CONNECTIONS ..E70XX ELECTRODES
   BOLTED CONNECTIONS ASTM A307 BOLTS
   CONCRETE 3000 PSI AT 28 DAYS
   PRECAST CONCRETE 5000 PSI AT 28 DAYS
   REINFORCING STEEL BARS
   #4 THRU #10 BARS ASTM A615 - GRADE 60
   #2 & #3 BARS ASTM A615 - GRADE 40

3. FOOTING NOTES

   1. ALL FOOTINGS ARE ASSUMED TO BEAR ON NATIVE SOILS. IF QUESTIONABLE SOILS ARE ENCOUNTERED -CONTRACTOR IS TO NOTIFY OWNER IMMEDIATELY
   2. ALL COORDINATION OF FOOTINGS, IMBEDS, AND PRECAST UNITS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR

4. CONCRETE

   1. ALL CONCRETE SHALL BE READY MIXED AND SUPPLIED IN ACCORDANCE WITH SPECIFICATION REQUIREMENTS. NO WATER SHALL BE ADDED TO MIX AT JOB SITE
   2. MINIMUM COVER REQUIREMENTS:
      CAST AGAINST EARTH = 3"
      FORMED WALLS = 1 1/2"

5. REINFORCING STEEL

   1. MINIMUM LAP REQUIREMENTS: 30 BAR DIAMETERS
   2. CORNER BARS REQUIRED @ FOOTING LOCATIONS OF SIZE AND QUANTITY OF HORIZONTAL STEEL @ ALL CORNERS AND INTERSECTIONS.

MONTANA
WES KRIVONEN 7601E REGISTERED PROFESSIONAL ENGINEER

KRIVONEN ASSOCIATES, P.C.
STRUCTURAL CONSULTANTS

JOB NAME SHAFT COVER	DRAWN BY D.K.	ENGINEER W.K.
LOCATION MONTANA	SCALE AS NOTED	
	DATE 3/27/95	
CONTRACTOR TO BE CHOSEN	JOB NUMBER	SHEET
DESCRIPTION PLANS & DETAILS	484	S1 △

SITE PLAN AND GENERAL LAYOUT

PROSPECTOR SITE

(2 OF 2)

NE 1/4 SE 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

DATE	
DRAWN BY	
APPROVED BY	
REVISIONS NO. / DATE / BY	
SHEET NO. 12 of 20	

ATOMIC SITE WORK DESCRIPTION

Structure Removal - The headframe at the Atomic will be completely dismantled and removed from the site. The dismantled structure will be hauled to the local landfill. It consists of five 7' to 12' long timbers (8"-12" square) and two short timber pilings. Any salvageable materials will become the Contractor's property.

Bulkhead and Shaft Timber Removal - The surface deck (approx. 8' x 10') and the top 13 feet of timbers and wood planks lining the shaft must be removed from the shaft. All debris from these operations must be collected and hauled to the local landfill. The Shaft Cross-Sections show the construction of the shaft.

- Debris Cleanup - Debris (approx. 8 CY) in the cut below the shaft must be removed and hauled to the county landfill.

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area must be stripped of vegetation and other objectionable materials. The refuse resulting from this operation will be treated as debris and will be hauled to the local landfill. It is anticipated that only a portion of the total area will be affected by this operation. An estimated 0.062 acres will be affected.

Salvage and Replace Topsoil - All recoverable topsoil must be stripped from the area which will be disturbed by site grading and backfilling. Assuming an average of 6-inches of cover soil can be salvaged in the areas around the cut, shaft and subsidence; an estimated 50 cubic-yards of soil will be salvaged, stockpiled, and later replaced on the regraded area. Cover soil will be respread evenly over the entire regraded area and brought to a friable condition ready for seeding.

Backfill Mine Openings - The shaft will be eliminated partially by regrading and partially by backfilling with material borrowed from the adjacent area (approx. 15 CY). It will be regraded to the approximate contours shown on the Regrading Plan.

The surface cut between the road and the shaft will be utilized as a borrow source for the Railroad Adit 2 Site and will supply approximately 40 cubic-yards of material from it's southeast corner. (See cut isopach on the Regrading Plan.) The surface cut will be backfilled as part of the Atomic Site reclamation. It is estimated that 69 cubic-yards of backfill will be required to recontour the cut with maximum 3H:1V slopes as shown on the Regrading Plan.

Adit Demolition and Backfilling - As shown on the Adit Cross-Section, the first 54 feet of the adit will be completely demolished by digging-out the adit timbers and lagging which are in the caved area or are uncovered by excavation. The adit excavation will begin at the portal where the adit roof is partially caved and extend into approximately 6 feet of cover at the end. It will not be necessary to remove 100-percent of the timbers from the excavation; however, timbers left in the opening must not interfere with effective backfilling and grading. Mine timbers and other debris removed from the adit will be hauled to the local landfill. It is anticipated that approximately 75 cubic-yards of excavation will be required to uncover and remove the mine timbers.

After the mine timbers have been removed, the Contractor will backfill and regrade the trench created by the collapse and excavation of the adit. Approximately 99 cubic-yards of material will be required to backfill the resulting trench to the grades specified on the Grading Plan. The material will be obtained by replacing the material excavated during adit demolition and by regrading the adjacent area. The areas around the adit, shaft and surface cut will be blended to form a broad swale draining toward the road. Grades will not exceed 3H:1V. The longitudinal profile of the swale will make a smooth transition from the original ground elevation at the head of the disturbed area to the road elevation at the bottom. The regraded contours will blend smoothly with the surrounding terrain.

Probe Mine Openings - Prior to backfilling the adit, the end will be probed for a distance of 5 feet to determine if the adit is completely blocked. Probing the opening will be accomplished by digging out a sufficient amount of the caved material to determine if the caved portion of the adit extends beyond this distance. Mine timbers and other debris that may be choking the adit will be removed and hauled to the local landfill. If the adit is determined to be sufficiently caved, the excavation will be backfilled as part of this operation. If the adit is reopened, an adit closure will be required.

Adit Closure - If the adit can be opened-up by probing, a 19-foot long backfill plug will be installed inside the adit to seal the underground opening. Plug length is measured along the roof from the brow of the opening back to the point where the top of the plug begins to slope down from the roof of the opening. The plug must provide complete blockage of the opening over the specified plug length. It is estimated that a plug will require 9 cubic-yards of backfill.

Fertilize, Seed, and Mulch - All areas disturbed (including roads and stockpile areas) will be seeded, fertilized and mulched. The total area involved in the reclamation of these areas is estimated at 0.149 acres. Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed (PLS) per acre, which is twice the application rate for drill seeding. Fertilizer will be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch shall be applied at a rate of 3,999 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free". Revegetation is estimated to require: 7.2 lbs. of PLS, 13.8 lbs. of fertilizer, and 459 lbs. of mulch.

Straw Bales - The constructed swale will require straw bale erosion control measures as shown on the Grading Plan. Approximately 5 bales will be required. Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads. Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free". Installation of the straw bales shall consist of two staggered rows across the full width of the swale. The straw bales shall be embedded into the ground a minimum of six (6) inches. Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

LAND & MINERAL OWNERSHIP

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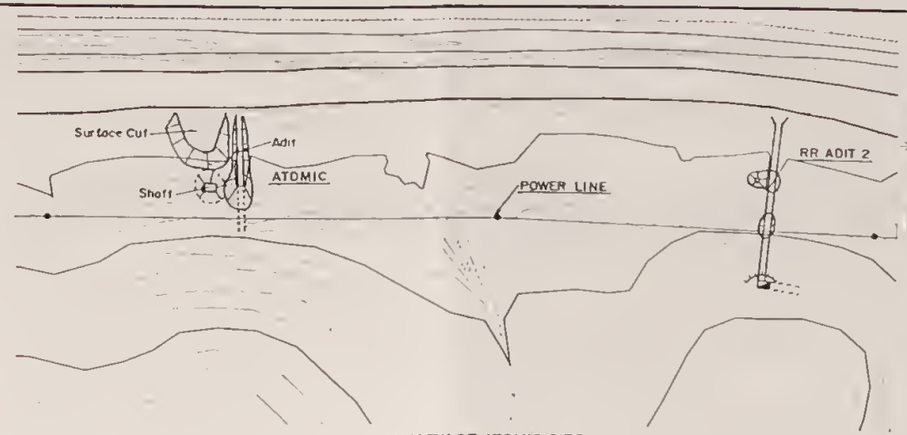
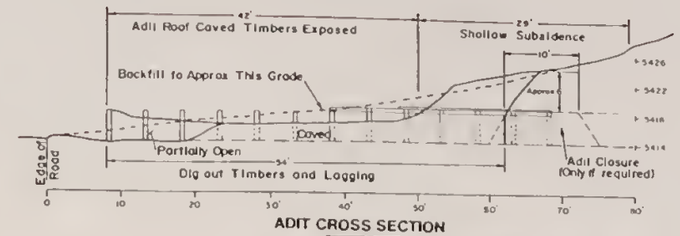
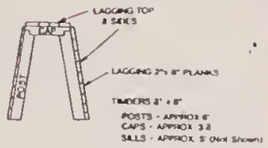


PLAN VIEW OF ATOMIC SITE

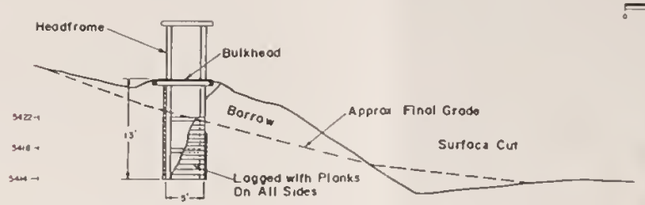


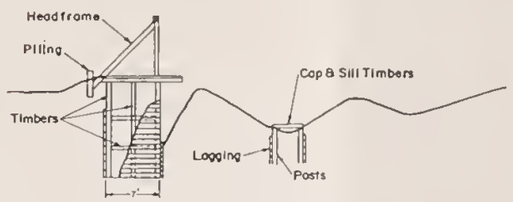
ADIT CROSS SECTION



TYPICAL ADIT TIMBER CONSTRUCTION

Portal on Atomic adit.



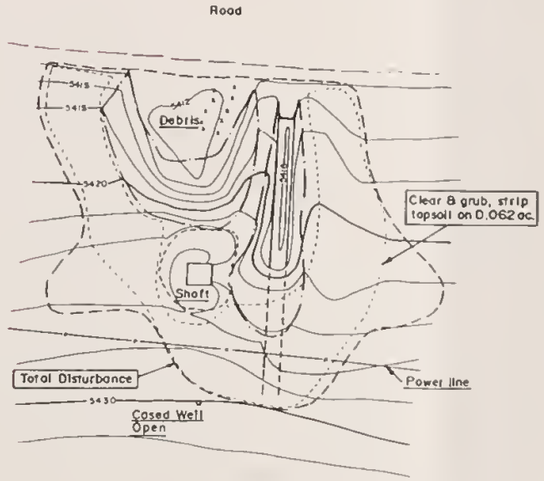


SHAFT CROSS SECTION

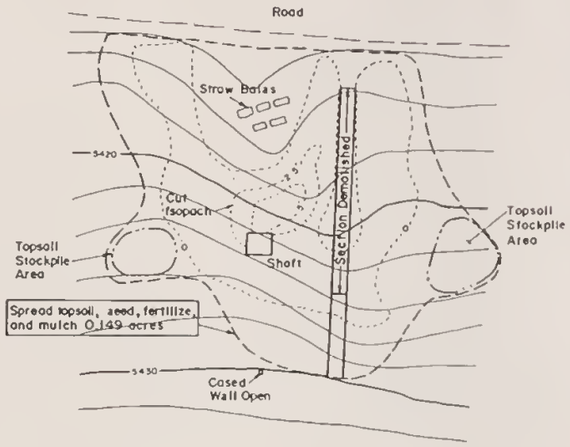
Timbers exposed on side of shaft.

View of headframe and bulkhead.

Remove debris in surface cut.
Use cut for Railroad Adit 2 borrow.



SITE PLAN VIEW



GRADING PLAN

SITE PLAN AND GENERAL LAYOUT

ATOMIC SITE

NW 1/4 OF SECTION 22, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE	October 1994
DRAWN BY	DLD
APPROVED BY	DM
REVISIONS NO	DATE / BY
SHEET NO.	13 of 20

RAILROAD ADIT 1 SITE WORK DESCRIPTION

Clear and Grub - In order to prepare the site for topsoil salvage, the area required for adit demolition and backfilling must be stripped of vegetation and other objectionable materials. The refuse resulting from this operation will be treated as debris and will be hauled to the local landfill. It is estimated that 0.109 acre will be affected.

Salvage and Replace Topsoil - All recoverable cover soil must be stripped from the area which will be disturbed by the adit demolition and backfilling operation. Assuming an average of 6-inches of cover soil can be salvaged, an estimated 85 cubic-yards of soil will be salvaged, stockpiled, and later replaced on the regraded area. Cover soil will be respread evenly over the regraded area and will be brought to a friable condition suitable for seeding.

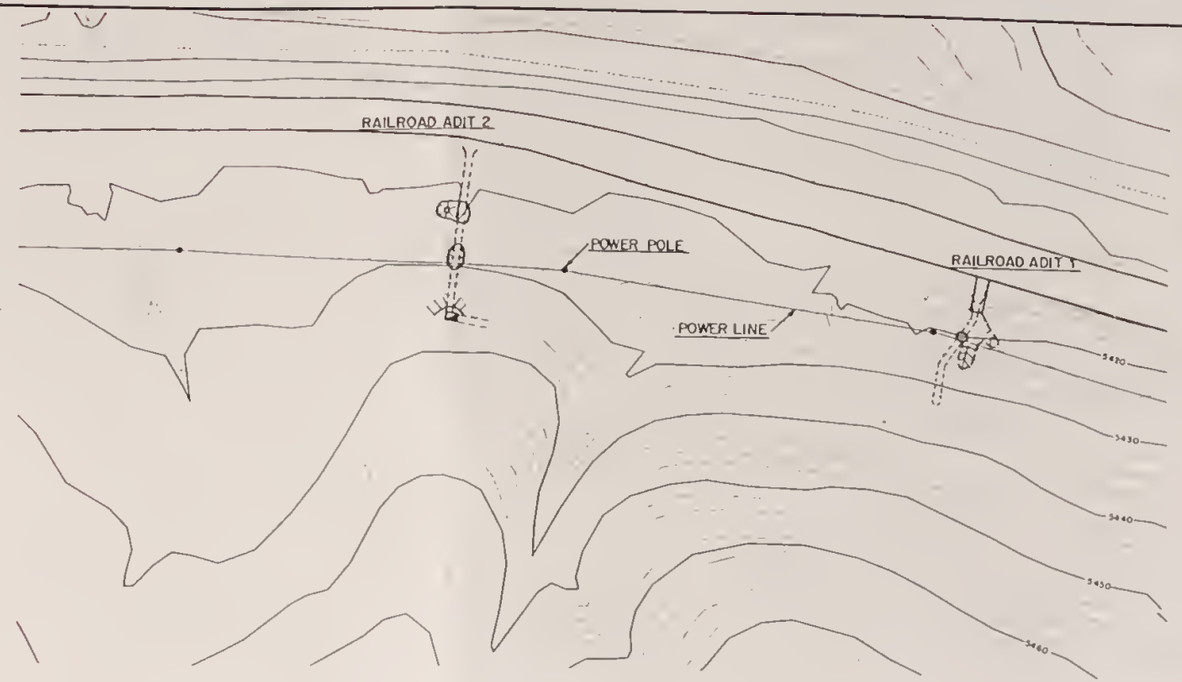
Adit Demolition and Backfilling - As shown on the Cross-Section and Regrading Profile, the first 52 feet of the adit will be completely demolished by digging-out the timbers and lagging which provide support to the roof and walls. The adit excavation will begin at the portal where there is less than 1 foot of cover over the adit roof and extend into 11 feet of cover at the end. Since the adit is 6-feet high, the maximum depth of the excavation will be around 17 feet. In areas where over 10-feet of backfill will be replaced, it will not be necessary to remove 100-percent of the timbers from the excavation. However, any timbers left in the opening must not interfere with affective backfilling. Mine timbers and other debris removed from the adit will be hauled to the local landfill.

After the mine timbers have been removed, the Contractor will backfill and regrade the subsidence features and the trench created by the collapse and excavation of the adit. The area will be graded as a broad swale draining toward the road. Sideslopes along the swale will not exceed 3H:1V. The longitudinal profile of the swale will make a smooth transition from the original ground elevation at the head of the disturbed area to the road elevation at the bottom. The final grade along the bottom of the swale will be reasonably close to the profile shown on the Cross-Section and Regrading Profile. It is anticipated that approximately 175 cubic-yards of excavation will be required to uncover and remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades specified.

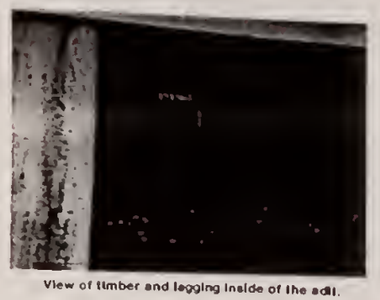
Adit Closure - At a distance of about 52-feet in from the portal, it is anticipated that adit demolition will be forced to stop because the remainder of the adit will be under solid rock. At this point, a 5-ft long backfill plug will be installed inside the adit to seal the underground opening and to prevent subsidence. Plug length is measured along the roof from the brow of the opening back to the point where the top of the plug begins to slope down from the roof of the opening. The plug must provide complete blockage of the opening over the specified plug length. It is estimated that this plug will require 11 cubic-yards of backfill.

Fertilize, Seed, and Mulch - The total affected area including construction roads and stockpile areas (0.165 acres) must be graded then fertilized, seeded and mulched. Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed per acre, which is twice the application rate for drill seeding. Fertilizer will be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch shall be applied at a rate of 3,000 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free". Revegetation is estimated to require: 7.9 lbs. of PLS, 15.3 lbs. of fertilizer, and 500 lbs. of mulch.

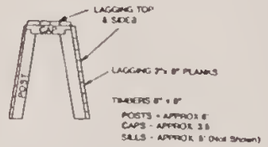
Straw Bales - All constructed swales will require straw bale erosion control measures as shown on the site plan. Approximately 7 bales will be required. Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads. Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free". Installation of the straw bales shall consist of two staggered rows across the full width of the swale. The straw bales shall be embedded into the ground a minimum of six (6) inches. Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.



PLAN VIEW OF RAILROAD ADIT 1 SITE

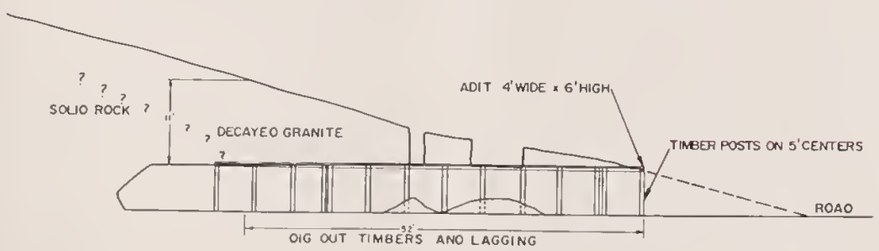


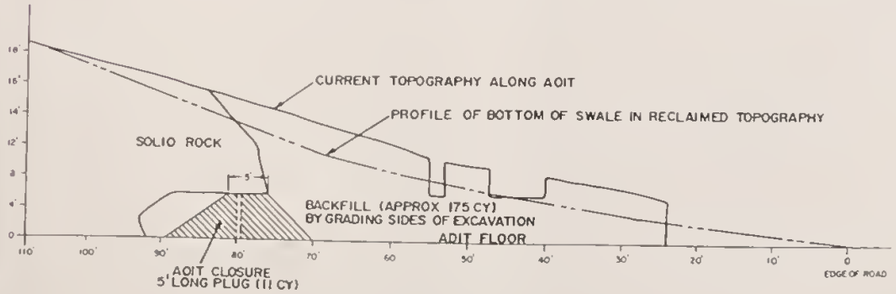
View of timber and lagging inside of the adit.



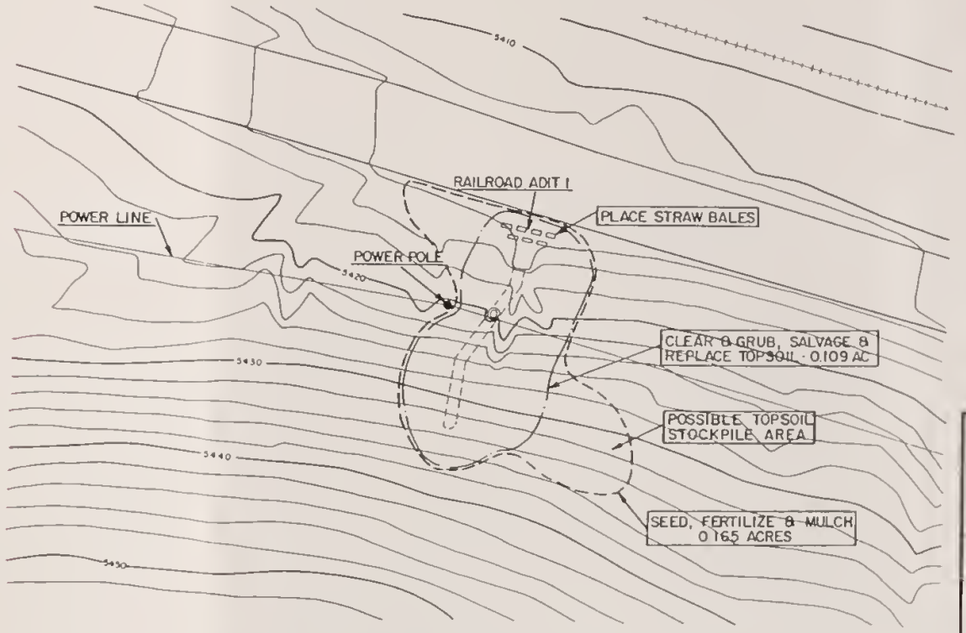
TYPICAL ADIT TIMBER CONSTRUCTION

Railroad Adit 1 portal and power pole.





CROSS SECTION AND REGRADING PROFILE



SITE PLAN

LAND & MINERAL OWNERSHIP

R.W. RICHTER & R.H. KEARNEY
RFD #2, P.O. BOX 235
BUTTE, MONTANA 59701
PHONE 406-792-6286

SITE PLAN AND GENERAL LAYOUT

RAILROAD ADIT 1

NW 1/4 OF SECTION 22 T3N R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
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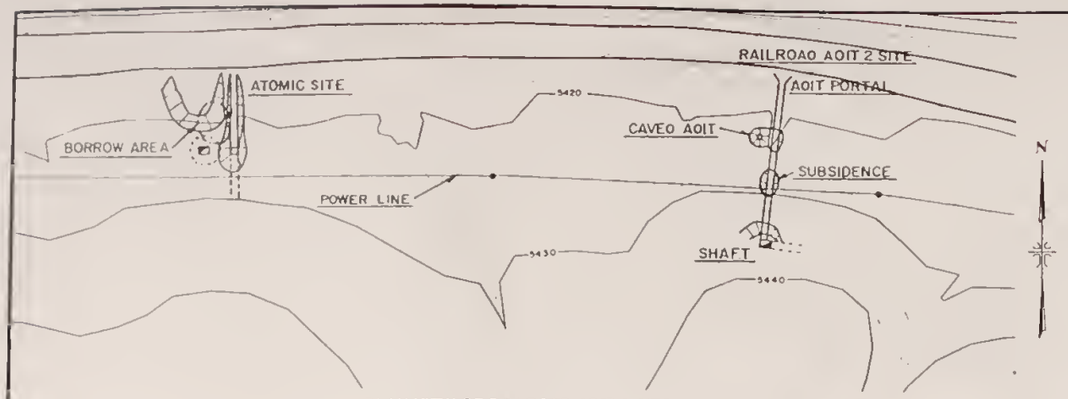
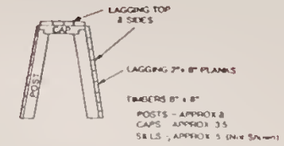
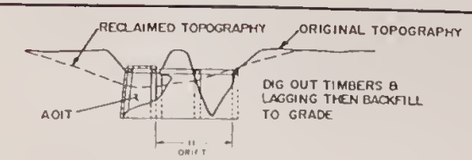


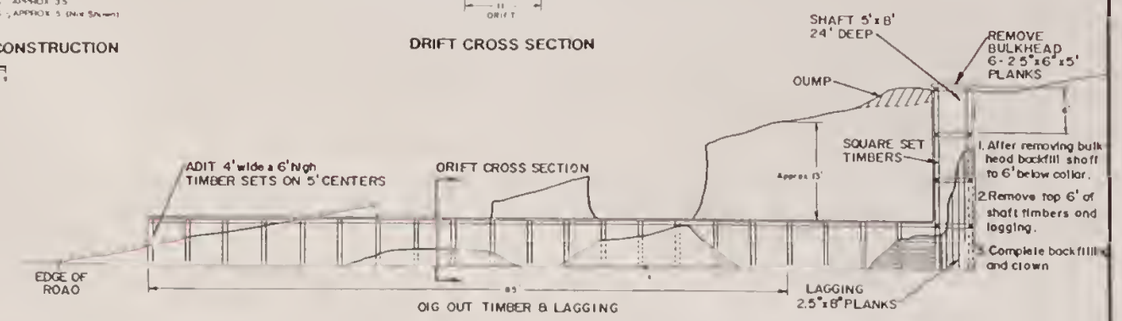
PLAN VIEW OF RAILROAD ADIT 2 SITE



TYPICAL ADIT TIMBER CONSTRUCTION



DRIFT CROSS SECTION



RAILROAD ADIT 2 SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - At the shaft, the surface bulkhead (6 planks nailed to the shaft collar) and the top 6 feet of shaft timbers and lagging which line the shaft must be removed. All debris from these operations must be collected and hauled to the local landfill. The shaft timbers should not be removed until the bottom 18-feet of the shaft has been backfilled.

Backfill Mine Openings - The shaft will be backfilled with the fill material mounded 1½-feet above the current collar elevation. The backfill crown will be graded to drain in all directions and will not have greater than 3H 1V slopes. The bottom 18-feet of the shaft will be backfilled before attempting to remove the top 6-feet of shaft timbers and lagging. It is estimated that this opening will require 56 cubic-yards of backfill. The adjacent dump will supply 16 cubic-yards. The remaining 40 cubic-yards will be borrowed from the surface cut at the Atomic Site. The borrow source is located 400 feet to the west and is adjacent to the road as shown on the Site Topography. The borrow area will be reclaimed as part of the Atomic Site. Topsoil salvage from the access route is not anticipated.

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area must be stripped of vegetation and other objectionable materials. The refuse resulting from this operation will be treated as debris and will be hauled to the local landfill. It is estimated that 0.111 acres will be affected at the site. The estimated area is shown on the Site Plan View.

Salvage and Replace Topsoil - All recoverable cover soil must be stripped from the area which will be disturbed by adit demolition and backfilling. Proposed recovery areas are shown on the site plan. Assuming an average of 6-inches of cover soil can be salvaged from the areas that are stripped, it is estimated that 90 cubic-yards of soil will be salvaged in the disturbance area. This cover soil will be stockpiled and later replaced on the regraded areas. Cover soil will be respread evenly and brought to a friable condition ready for seeding.

Adit Demolition and Backfilling - As shown on the Cross-Section and Regrading Profile, the first 85 feet of the adit and 13 feet of drift will be completely demolished by digging-out the timbers and lagging which provide support to the roof and walls. The adit excavation will begin at the portal where the adit roof is above the surface and extend into about 13 feet of cover at the end. Since the adit is 6-feet high, the maximum depth of the excavation will be around 19 feet. In areas where the backfill depth will be at least 10-feet above the adit floor, it will not be necessary to remove 100-percent of the timbers from the excavation. However, any timbers left in the opening must not interfere with effective backfilling. Mine timbers and other debris removed from the adit will be hauled to the local landfill. Because this adit continues underground beyond the point specified for demolition, the Contractor will be required to install a plug in the open adit before completing the backfilling operation.

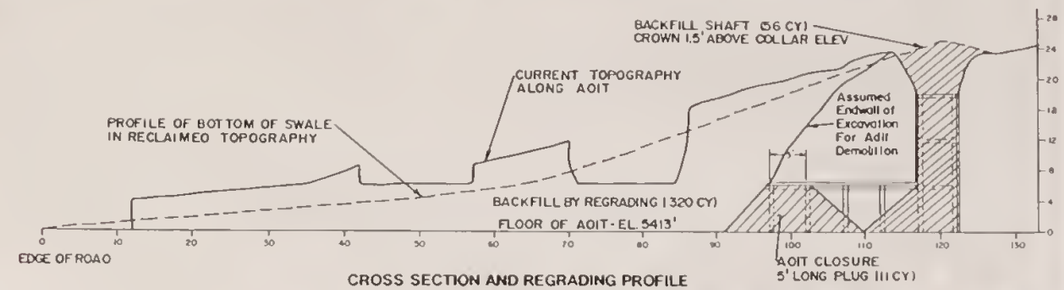
After the mine timbers have been removed, the Contractor will backfill and regrade the trench created by the collapse and excavation of the adit and drift. The backfilled area will be graded as a broad swale draining toward the road and will be contoured to blend with adjacent terrain. Sideslopes along the swales will not exceed 3H:1V. The longitudinal profile of each swale will make a smooth transition from the regraded contours at the head of the disturbed area to the road elevation at the bottom. It is anticipated that approximately 320 cubic-yards of excavation will be required to uncover and remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades shown on the Cross-Section and Regrading Profile.

Adit Closure - At a distance of approximately 85-feet in from the portal, adit demolition will be stopped. At this point, a 5-ft long backfill plug will be installed inside the adit to seal the underground opening and to prevent subsidence. Plug length is measured along the roof from the brow of the opening back to the point where the top of the plug begins to slope down from the roof of the opening. The plug must provide complete blockage of the opening over the specified plug length. It is estimated that this plug will require 11 cubic-yards of backfill.

Fertilize, Seed, and Mulch - The total affected area including construction roads and stockpile areas (0.280 acres) must be graded then fertilized, seeded and mulched. Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed per acre, which is twice the application rate for drill seeding. Fertilizer will be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch shall be applied at a rate of 3,000 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free". Revegetation is estimated to require: 13.4 lbs of PLS, 25.9 lbs of fertilizer, and 850 lbs of mulch.

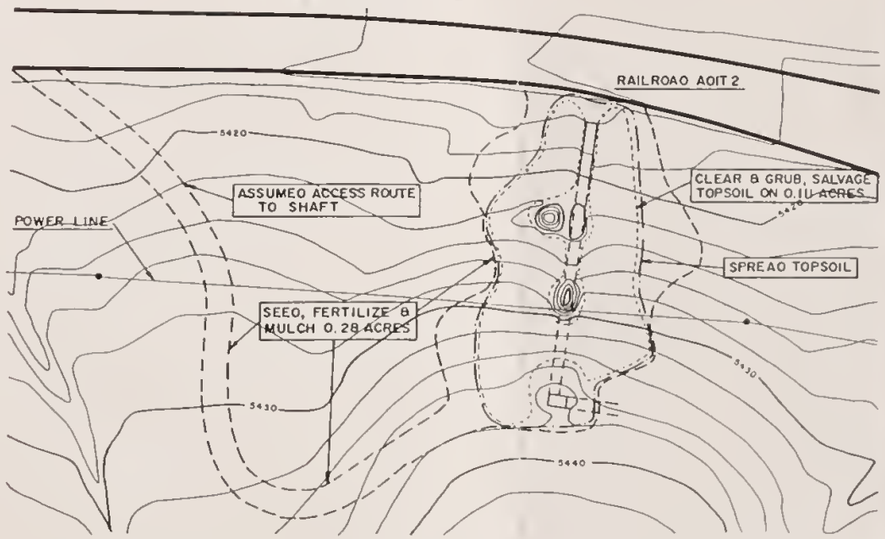
Straw Bales - The constructed swale will require straw bale erosion control measures as shown on the site plan. Approximately 7 bales will be required. Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads. Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free". Installation of the straw bales shall consist of two staggered rows across the full width of the swale. The straw bales shall be embedded into the ground a minimum of six (6) inches. Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

Railroad Adit 2 portal.



CROSS SECTION AND REGRADING PROFILE

STRAW BALE EROSION CONTROL DETAIL



SITE PLAN

View of shaft bulkhead.

Looking into timber lined shaft

Adit roof exposed in subsidence holes and at the surface.

LAND & MINERAL OWNERSHIP

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BUTTE, MT 59701
PHONE 406-792-6286

SITE PLAN AND GENERAL LAYOUT

RAILROAD ADIT 2 SITE

NW 1/4 OF SECTION 22 T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

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Mining and Civil Engineers
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Billings, Montana 59101
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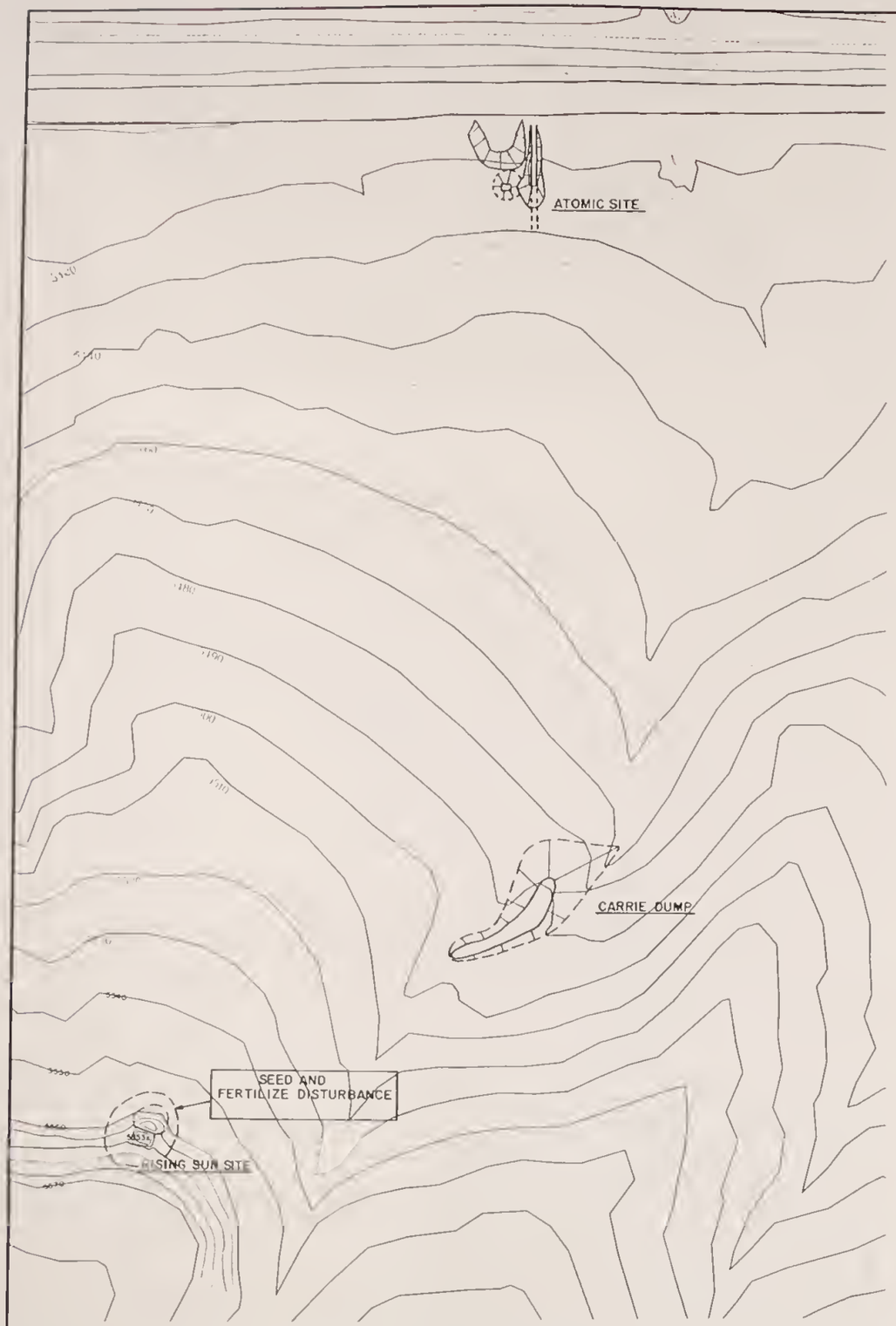
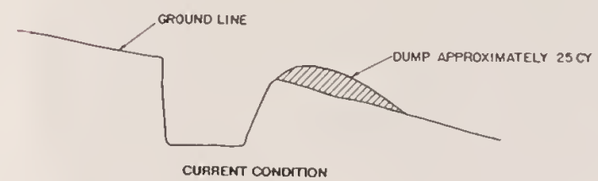


PLAN VIEW OF RISING SUN SITE

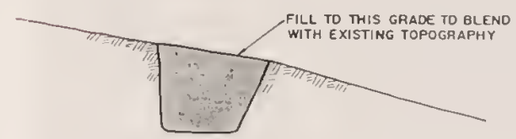
RISING SUN SITE WORK DESCRIPTION

Backfill Mine Openings - The Rising Sun Shaft will be backfilled with approximately 55 cubic-yards of material which can be excavated from the adjacent dump and from the surrounding area. The Contractor will grade the disturbed area to blend with the surrounding contours using maximum 3H:1V slopes. The unit price bid for backfilling will include all backfill and borrow area grading and any access preparation.

Seed and Fertilize - The disturbed areas at the Rising Sun Site will be seeded and fertilized. Due to the limited access requirements, access route reclamation is not anticipated; however, the Contractor will be required to reseed any access distrubance that the Owner's representative may order. Approximately 0.06 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds o nutrients per acre. It is estimated that 2.9 pounds of Pure-Live-Seed and 6.5 pounds of fertilizer will be required. After application, the reseeded area will be tracked. Raking may be substituted in areas that cannot be tracked. Seed certifications and documentation of the seed mix must be submitted for approval prior to application.



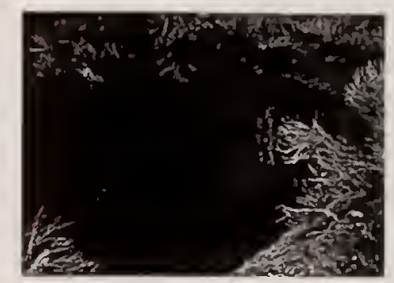
CURRENT CONDITION



FINAL CONFIGURATION

BACKFILL CROSS SECTION

View of surfsce around Rising Sun shaft and the adjacent dump.



View looking into the Rising Sun shaft

LAND & MINERAL OWNERSHIP

ROBERT EVAN KEELING
127S ROYAL BIRKDALE COURT
ROCKLEDGE, FLORIDA 329SS
PHONE (407) 639-1371

SITE PLAN AND GENERAL LAYOUT

RISING SUN SITE

SW 1/4 NW 1/4 OF SECTION 22 T3N R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

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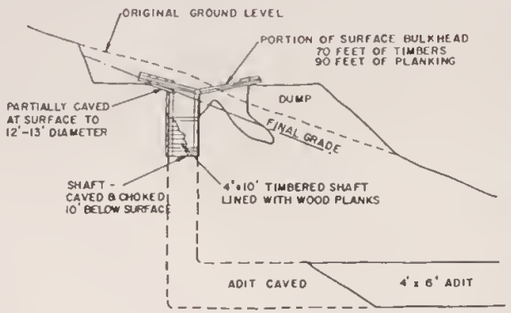
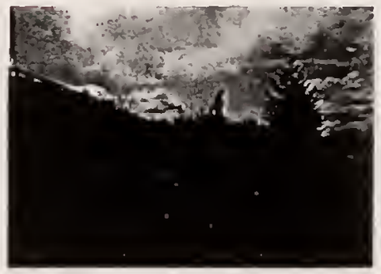


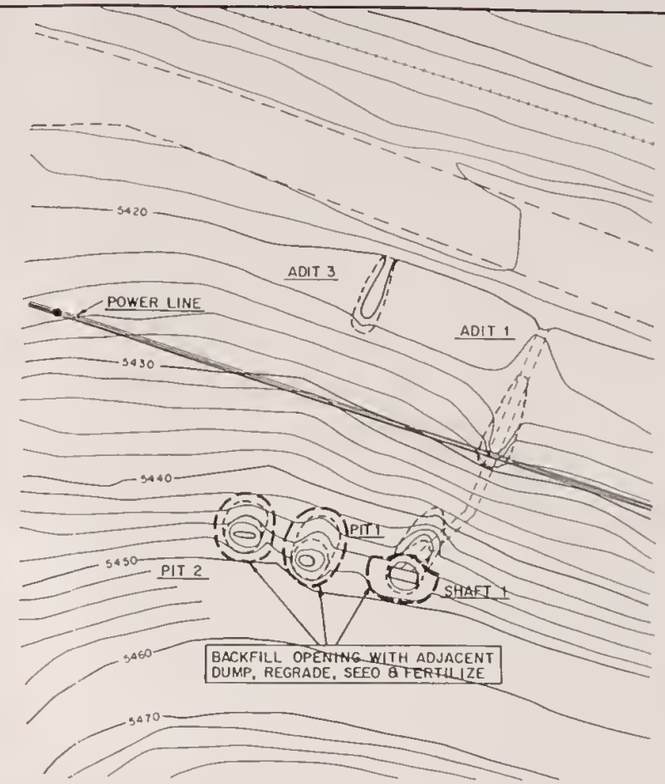
1. REMOVE REMAINS OF BULKHEAD AND TOP 10' OF SHAFT TIMBERS AND OTHER DEBRIS IN SHAFT.
2. PROBE TO DEPTH OF 16' BELOW SURFACE
3. USE APPROXIMATELY 30 CUBIC YARDS OF ADJACENT DUMP MATERIAL TO BACKFILL SHAFT, SUBSIDENCE FEATURE, AND SURFACE CUT.
4. SEED AND FERTILIZE BACKFILLED AREA

CROSS SECTION VIEW OF SHAFT #1

Remove & dispose of bulkhead components at Shaft 1.



View of surface cut and dump at Shaft 1. Entire dump will be consumed by borrow for Shaft 1 & Adit 1.



PLAN VIEW FOR SHAFT 1, PIT #1 & PIT #2

Pit #1 - 5 1/2 ft. deep with top diameter of 14 ft. tapering to 4 1/2 ft. at the bottom. Backfill using adjacent dump material. Approximately 18 cubic yards.

Pit #2 - 5 ft. deep with top diameter of 16 ft. tapering to 8'x3' at the bottom. Backfill using adjacent dump material. Approximately 21 cubic yards

STORM KING WORK DESCRIPTION FOR SHAFT AND PITS

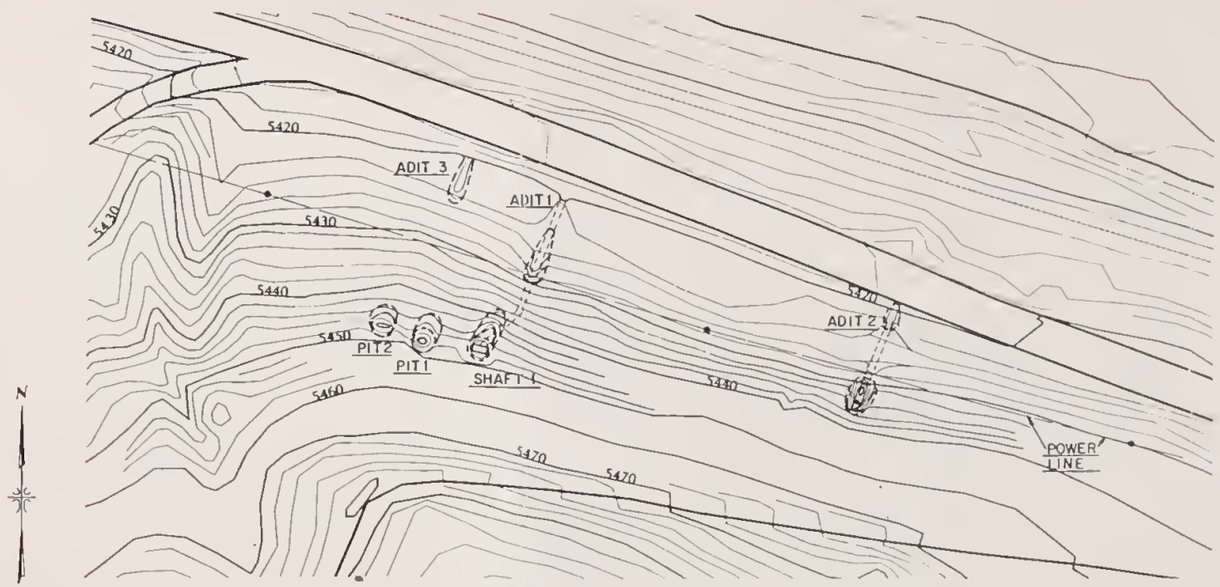
Bulkhead and Shaft Timber Removal - At Shaft #1, the Contractor will remove what remains of the surface bulkhead and the top 10 feet of timbers and wood planks lining the shaft. All debris from these operations must be collected and hauled to the local landfill

Probe Mine Openings - Prior to backfilling Shaft #1, this opening will be probed. Shaft #1 will be probed to a depth of 16 feet below the collar. This will require about 6 feet of excavation below the point where the shaft is currently blocked. Probing the opening will be accomplished by digging out the mine timbers, rock, and other debris that could be choking the shaft. Any debris removed from the shaft will be hauled to the local landfill. A backhoe or excavator with a long reach and a 1-2 yard bucket is well suited for probing. Probe mine opening includes all excavation, replacement and disposal.

Backfill Mine Openings - Pits #1 and #2 will be backfilled to the surface with material from the adjacent mine dumps. It is estimated that these openings will require 40 cubic-yards of backfill. The area disturbed by construction will be regraded to blend with the surrounding contours. Areas on the dump which are disturbed by borrow excavation will be regraded with maximum 2½H:1V slopes.

Shaft #1 and the subsidence feature and surface cut associated with it will be backfilled to the grade indicated on the Shaft 1- Cross-Section using material from the adjacent dump. Backfilling the shaft and adjacent subsidence feature will take approximately 30 cubic-yards unless the shaft can be reopened by probing. The backfilled areas will regraded with slopes not exceeding 2½H:1V except where required to blend with the surrounding contours. Final grading of the mine dump will be included in the Adit 1 regrading.

Seed and Fertilize - The affected areas associated with Pits #1 and Pit #2 and the Shaft 1 backfill area will be seeded and fertilized by broadcast methods. It is estimated that 0.04 acres will be reseeded. Broadcast seeding will be used requiring 48 pounds o Pure-Live-Seed per acre. Fertilizer will be epread over the reseeded area at the rate o 92.5 pounds of nutrients per acre. It is estimated that 1.9 pounds of Pure-Live-Seed and 3.7 pounds of fertilizer will be required.



PLAN VIEW OF STORM KING SITE

LAND & MINERAL OWNERSHIP

R.W. RICHTER & R.H. KEARNEY
RFD #2, P.O. BOX 235
BUTTE, MT 59701
PHONE 406-792-6286

SITE PLAN AND GENERAL LAYOUT

STORM KING SITE

(1 OF 2)

SE1/4 NW1/4 OF SECTION 22, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE	October 1994
DRAWN BY	DLD
APPROVED BY	DM

REVISIONS NO.	DATE	BY

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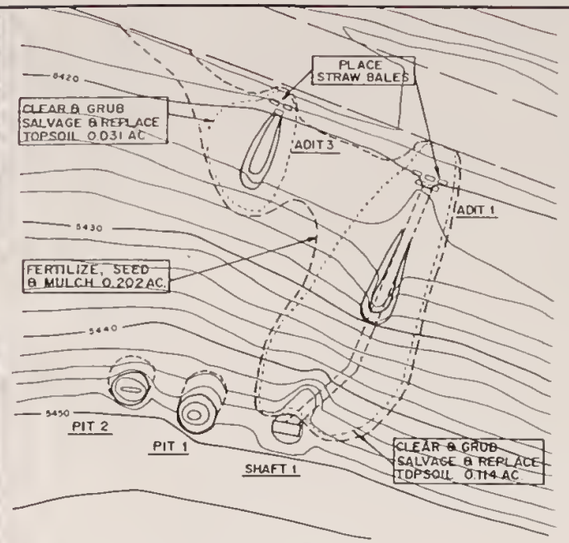
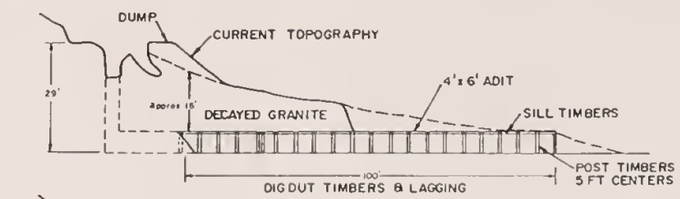
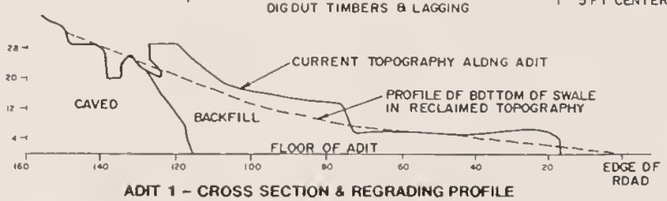
Adit 1 roof exposed at the surface for 55 feet.



PLAN VIEW OF ADITS 1 & 3

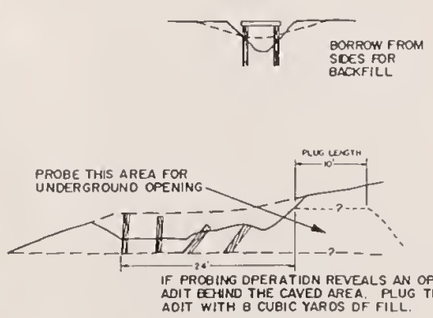
Adit 2 – Clear & grub, salvage and replace topsoil, demollah edit end backfill & revegetate.





ADIT 1 – CROSS SECTION & REGRADING PROFILE

Adit 3–Clear and grub, salvage and replace topsoil, demollah and backfill adit, probe openings, (plug open adit if required) and revegetate.



ADIT 3 – CROSS SECTION

STORM KING WORK DESCRIPTION FOR ADITS 1, 2, & 3

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area must be stripped of vegetation and other objectionable materials. The refuse resulting from this operation will be treated as debris and will be hauled to the local landfill. It is estimated that 0.223 acres will be affected at the site.

Salvage and Replace Topsoil - All recoverable cover soil must be stripped from the area which will be disturbed by adit demolition and backfilling. Proposed recovery areas are shown on the site plan. Assuming an average of 6-inches of cover soil can be salvaged from the areas that are stripped, it is estimated that 50 cubic-yards of soil will be salvaged in the disturbance area around Adit 1; that 60 cubic-yards of soil will be salvaged around Adit 2; and that 25 cubic-yards of soil will be salvaged at Adit 3. This cover soil will be stockpiled and later replaced on the regraded areas. Cover soil will be respread evenly and brought to a friable condition ready for seeding.

Adit Demolition and Backfilling - Adits 1, 2, and 3 will be completely demolished by digging-out the timbers and lagging which provide support to the roof and walls. In areas where the backfill depth will be at least 10-feet above the adit floor, it will not be necessary to remove 100-percent of the timbers from the excavation. However, any timbers left in the opening must not interfere with effective backfilling. Mine timbers and other debris removed from the adit will be hauled to the local landfill. After the mine timbers have been removed, the Contractor will backfill and regrade the trench created by the collapse and excavation of the adit. Backfilled areas will be graded as a broad swales draining toward the road and will be contoured to blend with adjacent terrain. Sideslopes along the swales will not exceed 3H:1V. The longitudinal profile of each swale will make a smooth transition from the regraded contours at the head of the disturbed area to the road elevation at the bottom.

The first 100 feet of the Adit 1 will be completely demolished. The adit excavation will begin at the portal where the adit roof is near the surface and extend back to where the adit is caved and blocked under 15 feet of cover. Since the adit is 6-feet high, the maximum depth of the excavation will be around 21 feet. Regraded contours will blend with adjacent terrain and with the backfilled area at Shaft #1. It is anticipated that approximately 450 cubic-yards of excavation will be required to uncover and remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades shown on the Adit 1 Cross-Section and Regrading Profile.

The first 55 feet of the Adit 2 will be completely demolished. The adit excavation will begin at the portal where the adit roof is near the surface and extend back to where the adit is caved under 8 feet of cover. Since the adit is 6-feet high, the maximum depth of the excavation will be around 14 feet. Because this adit could continue underground beyond the point where it is caved and blocked, the Contractor will be required to probe for an opening and install a plug if an opening is found. It is anticipated that approximately 100 cubic-yards of excavation will be required to uncover and remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades shown on the Adit 2 Cross-Section and Regrading Profile.

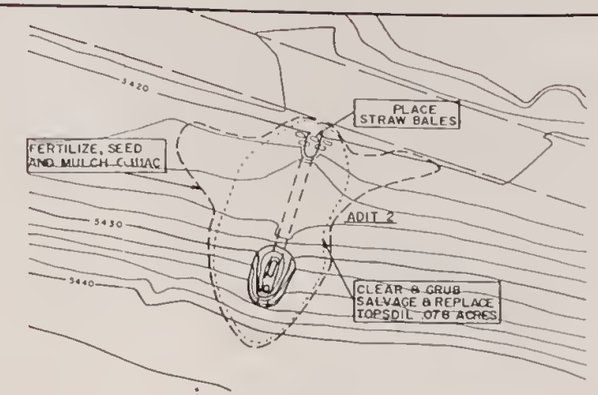
The Contractor will be required to dig out the timbers and lagging exposed in the 24 foot long collapsed portion of Adit 3. The maximum depth of the excavation will be around 10 feet. It is anticipated that approximately 20 cubic-yards of excavation will be required to remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades specified on the site plan. Because this adit could continue underground beyond the point where it is caved and blocked, the Contractor will be required to probe for an opening and install a plug if an opening is found.

Probe Mine Openings - Prior to backfilling Adit 2 and Adit 3, these openings will be probed. Adit 2 and Adit 3 will be probed for a distance of 5 feet from the point where the adits are currently caved and blocked. Probing the opening will be accomplished by digging out a sufficient amount of the caved material to determine if the caved portion of the adit extends beyond this distance. Mine timbers and other debris that may be choking the adits will be removed and hauled to the local landfill. If the adit is determined to be sufficiently caved, the excavation will be backfilled as part of this operation. If the adit is reopened, an adit closure will be required.

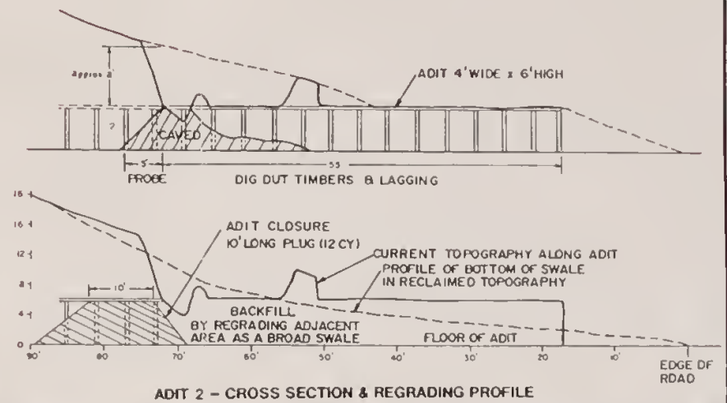
Adit Closure - If Adit 2 or Adit 3 can be opened-up by probing, 10-foot long backfill plugs will be installed inside these adits to seal the underground openings. Plug length is measured along the roof from the brow of the opening back to the point where the top of the plug begins to slope down from the roof of the opening. The plug must provide complete blockage of the opening over the specified plug length. It is estimated that a plug for Adit 2 will require 12 cubic-yards of backfill and that a plug for Adit 3 will require 8 cubic-yards of backfill.

Fertilize, Seed, and Mulch - All areas disturbed (including roads and stockpile areas) at Adit 1, Adit 2, and Adit 3 will be seeded, fertilized and mulched. The total area involved in the reclamation of these areas is estimated at 0.313 acres. Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed (PLS) per acre, which is twice the application rate for drill seeding. Fertilizer will be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch shall be applied at a rate of 3,000 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free". Revegetation is estimated to require: 15.0 lbs. of PLS, 29.0 lbs. of fertilizer, and 940 lbs. of mulch.

Straw Bales - All constructed swales will require straw bale erosion control measures as shown on the site plan. Approximately 13 bales will be required. Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads. Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free". Installation of the straw bales shall consist of two staggered rows across the full width of the swale. The straw bales shall be embedded into the ground a minimum of six (6) inches. Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.



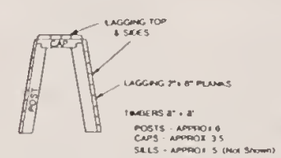
PLAN VIEW OF ADIT 2



ADIT 2 – CROSS SECTION & REGRADING PROFILE

Adit 2–Clear and grub, salvage and replace topsoil, demollah end backfill adit, probe opening, (plug open adit if required) end revegetate.

Looking downhill at subsidence hole & exposed Adit 2 roof.



TYPICAL ADIT TIMBER CONSTRUCTION

SITE PLAN AND GENERAL LAYOUT

STORM KING SITE

(2 OF 2)

SE 1/4 NW 1/4 OF SECTION 22, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE	October 1994
DRAWN BY	DLO
APPROVED BY	DM

REVISIONS NO	DATE	BY

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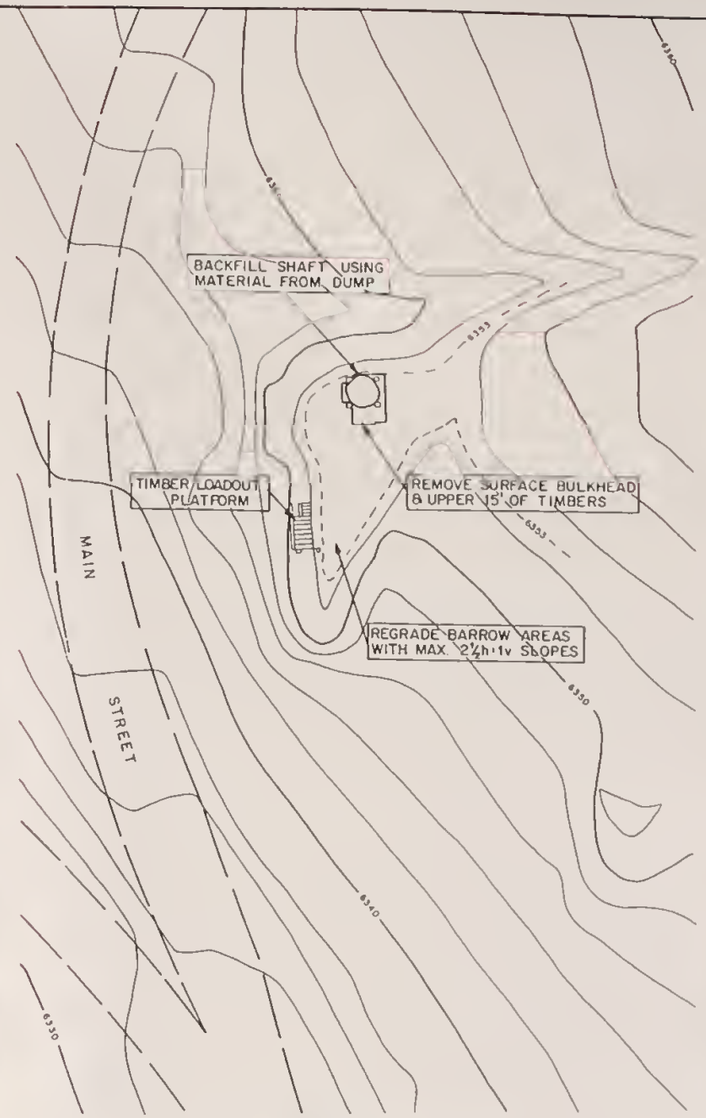
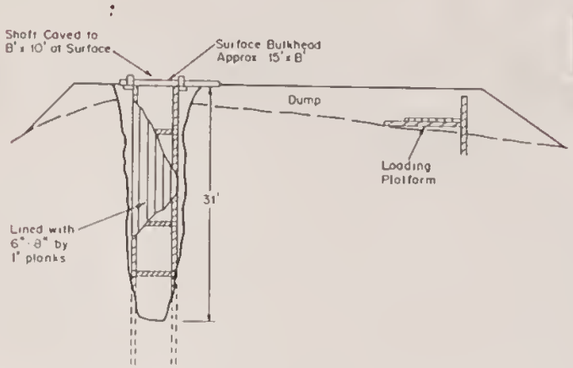
SILVERSMITH LOCATION MAP



PLAN VIEW OF SILVERSMITH SITE

View of surface bulkhead.



NORTH–SOUTH SECTION THROUGH SHAFT & DUMP

SILVERSMITH SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - The Contractor will remove what remains of the surface bulkhead and the top 15 feet of timbers and wood planks lining the shaft. All debris from these operations must be collected and hauled to the local landfill. The shaft timbers should not be removed until the shaft has been backfilled to within 15-feet of the surface. It is estimated that these operations will generate approximately 20 cubic-yards of debris.

Backfill Mine Openings - The shaft will be backfilled to the surface using material from the adjacent dump. Backfilling the shaft will take approximately 70 cubic-yards. The Contractor will use appropriate means to compact the fill. Borrow areas will be regraded with slopes not exceeding 2½H:1V except where required to blend with the surrounding contours.

View of Silversmith headframe and collar area before headframe was pulled down.

View of Silversmith Site with headframe still standing.

View of the Silversmith headframe laying on the mine dump.

View of dump and loading platform.

LAND & MINERAL OWNERSHIP

NORTH BUTTE MINING CO.
P.O. BOX 188
BUTTE, MT. 59703

SITE PLAN AND GENERAL LAYOUT

SILVERSMITH SITE

SW1/4 SE1/4 OF SECTION 1 T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE	April 1995
DRAWN BY	DLD
APPROVED BY	DM

REVISIONS NO.	DATE	BY

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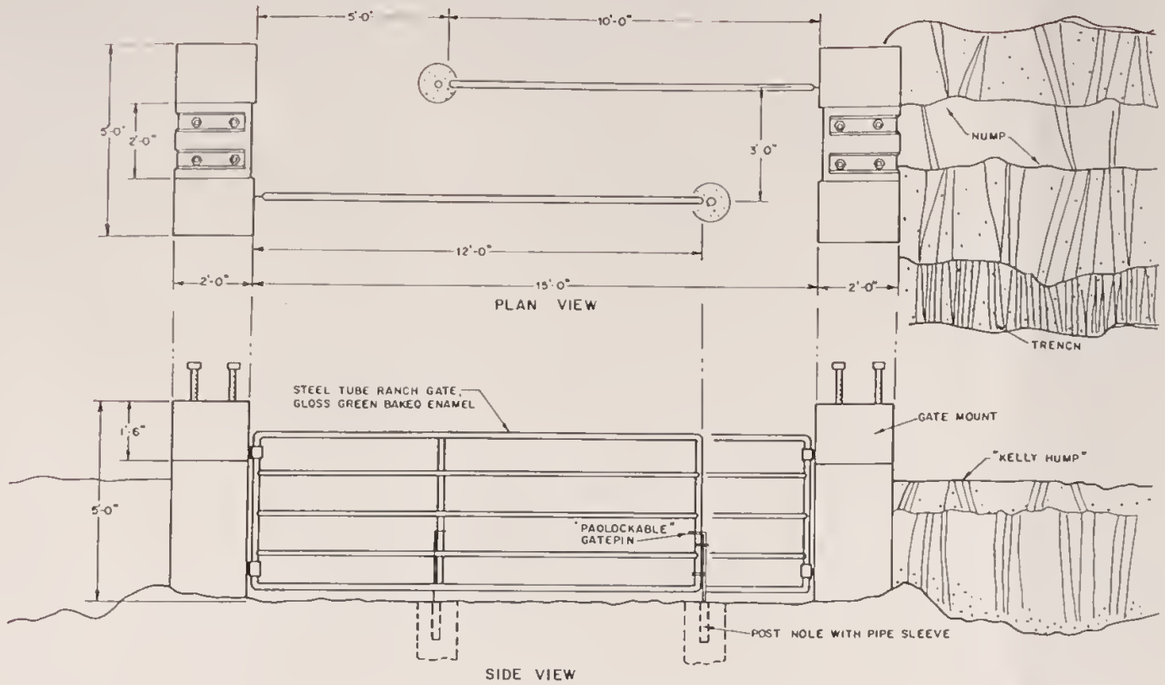
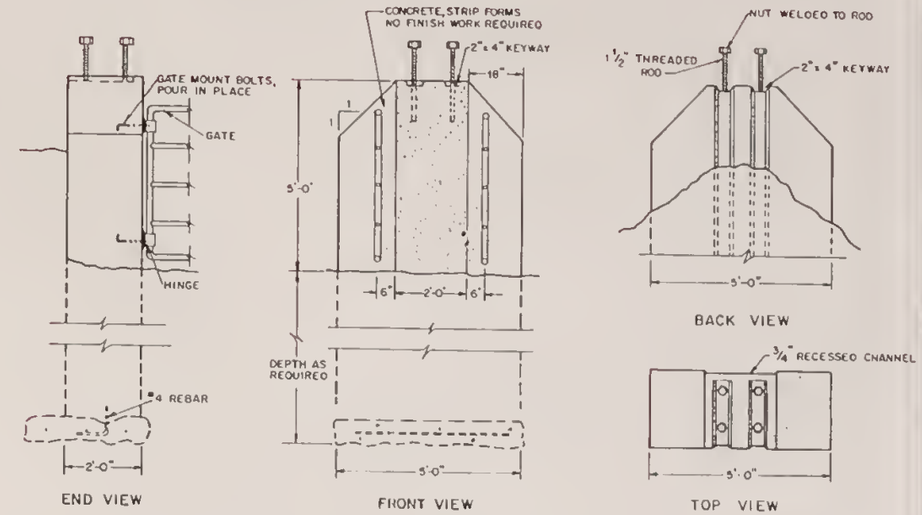
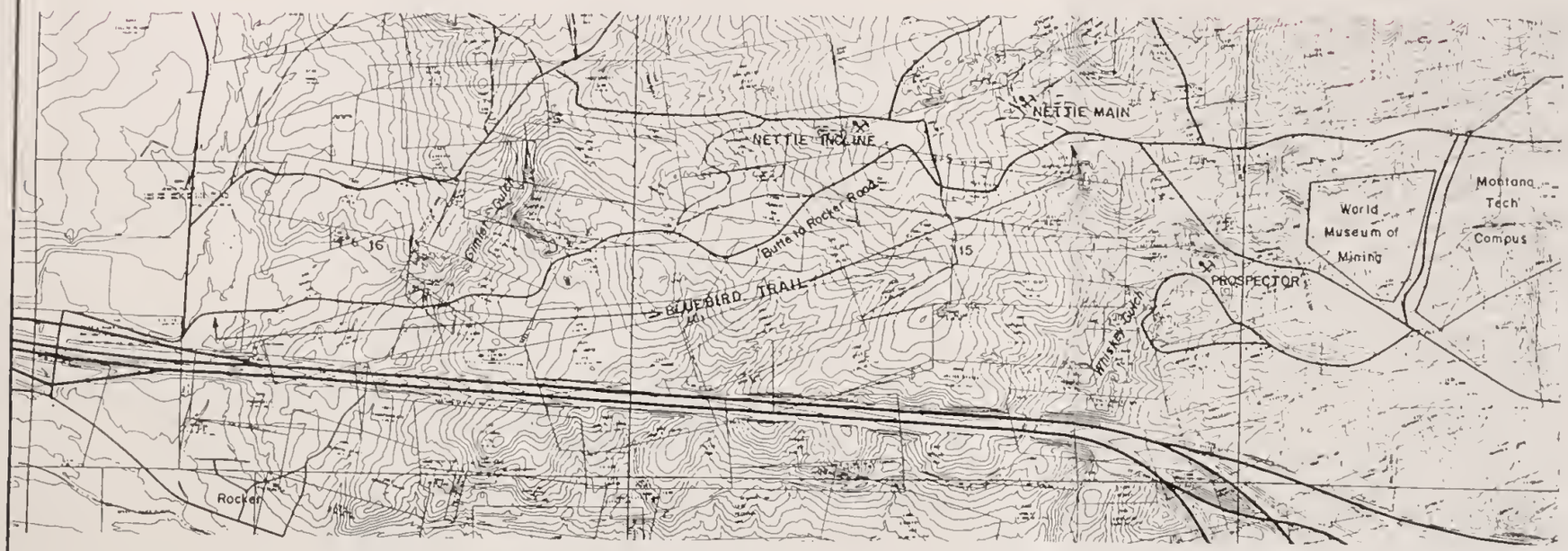


GATEWAY & "KELLY HUMP" DETAIL



CONCRETE GATE MOUNT DETAILS



SITE MAP

BLUEBIRD TRAIL WORK DESCRIPTION

Bluebird Trail Grading - Grading shall consist of blading and shaping the roadbed which is approximately 12-15 feet wide to remove ruts, washes, sloughs, and other irregularities that prevent normal runoff from the road surface. Shallow ruts, chuckholes, and washes will be removed by scarifying or cutting to the bottom of such defects. Deep ruts, chuckholes, and washes will be removed by filling and compacting to the extent possible under the existing conditions. The road will be graded with a uniform inslope or outslope across the entire width of the road to provide drainage. Existing drainage dips will be reshaped. At the conclusion of the grading and shaping operation, the roadbed will be dressed to produce to a smooth grade and cross-section.

The section of road specified for grading is generally indicated on the Site Location Map. If added to the work requirements, the section of road to be graded will be staked in the field by the Owner's representative. Materials for filling and grading large ruts and depressions will be supplied by Butte-Silver Bow and will be stockpiled on site.

Bluebird Trail Concrete Barrier and Gate Installation - Two concrete barrier and gate systems will be installed. A barrier and gate system will be installed at each end of the Bluebird Trail at locations which are to be selected and staked by the Owner's Representative. Each concrete barrier and gate installation will be constructed as shown on the details on this drawing.

SITE PLAN AND GENERAL LAYOUT

BLUEBIRD TRAIL

SECTIONS 15 & 16, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1825 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE	June 1995
DRAWN BY	DLD
APPROVED BY	WCM
REVISIONS	
NO.	DATE	BY
SHEET NO	20 of 20

ATTACHMENT 6

AS-BUILT DRAWINGS

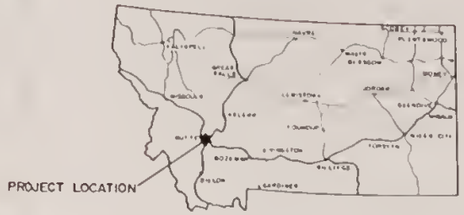
PHOTO INDEX

WEST BUTTE HMO PROJECT

DSL/AMRB 94-009

SILVER BOW COUNTY, MONTANA

PREPARED FOR:
MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU



LAND AND MINERAL OWNERS
Group - 1 Sites

Butte Precious Metals
321 West Park St
Butte, MT 59701

Arch Dudden
2417 Yale Av.
Butte, MT 59701
406-723-5802

West Butte Metals
P.O. Box 605
Butte, MT 59703

Eric Nelson
2106 Duncan Dr.
Missoula, MT 59801
406-728-7952

Robert & Lillian Field
7756 E. Third
Scottsdale, AZ 85251

Margaret Thomas
1620 43rd Ave. E., #3A
Seattle, WA 98112

LAND AND MINERAL OWNERS
Group - 2 Sites

R.W. Richter and R.H. Kearney
RFD #2, P.O. Box 235
Butte, MT 59701
406-792-6286

Robert Evan Keeling
1275 Royal Birkdale Court
Rockledge, Fl 32955
407-639-1371

LAND AND MINERAL OWNER
Group - 3 Sites

North Butte Mining Co.
P.O. Box 188
Butte, MT 59703

SITE AND VICINITY MAP
USGS 7.5 MIN QUADS - BUTTE NORTH & BUTTE SOUTH

MAP INDEX

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Access Map	Sheet 2
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Great Republic Site	Sheet 4
Nemo South Site	Sheet 5
Nettie Main Site	Sheet 6
Nettie Incline Site	Sheet 7
Olson Fraction Site	Sheet 8
Plutus Site (1 of 2)	Sheet 9
Plutus Site (2 of 2)	Sheet 10
Prospector Site (1 of 2)	Sheet 11
Prospector Site (2 of 2)	Sheet 12
Atomic Site	Sheet 13
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Rising Sun Site	Sheet 16
Storm King Site (1 of 2)	Sheet 17
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Silversmith Site	Sheet 19
Bluebird Trail	Sheet 20

HAZARD NOTICE

MANY POTENTIAL HAZARDS EXIST IN THE PROJECT AREA. THE EXTENT OF THESE HAZARDS IS NOT FULLY KNOWN. THE CONTRACTOR, SUBCONTRACTORS, AND THEIR EMPLOYEES WILL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS IN THE PERFORMANCE OF THE REQUIRED WORK. CONTRACTORS AND OTHER PERSONS WORKING ON THIS PROJECT SHALL BE FULLY RESPONSIBLE FOR APPRISING THEMSELVES OF ANY HAZARDOUS CONDITIONS WHICH MAY EXIST AND SHALL TAKE WHATEVER STEPS ARE NECESSARY TO INSURE THEIR SAFETY AND THE SAFETY OF OTHERS WHILE PERFORMING THEIR DUTIES.

SITE PLAN AND GENERAL LAYOUT

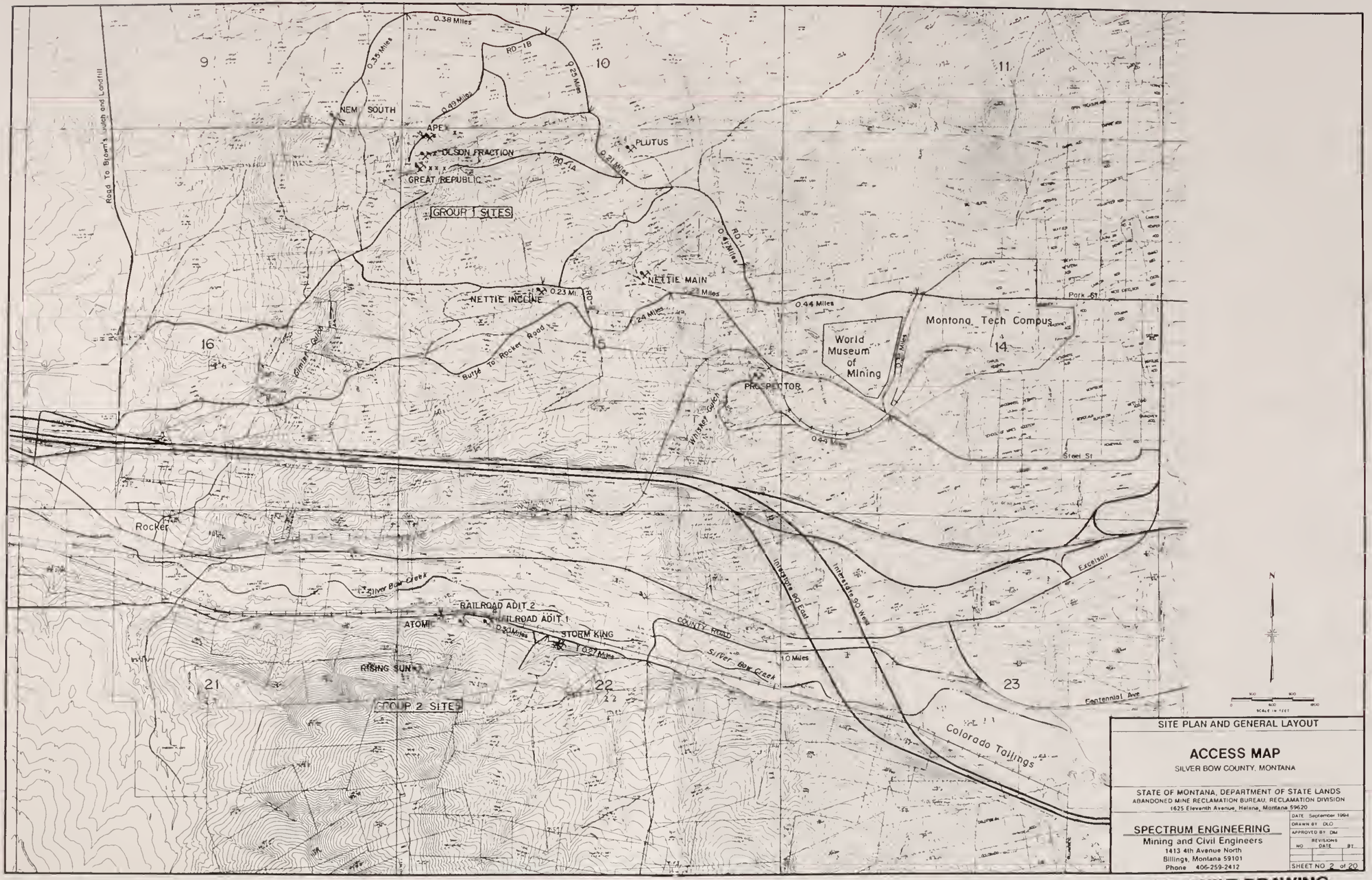
COVER SHEET

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

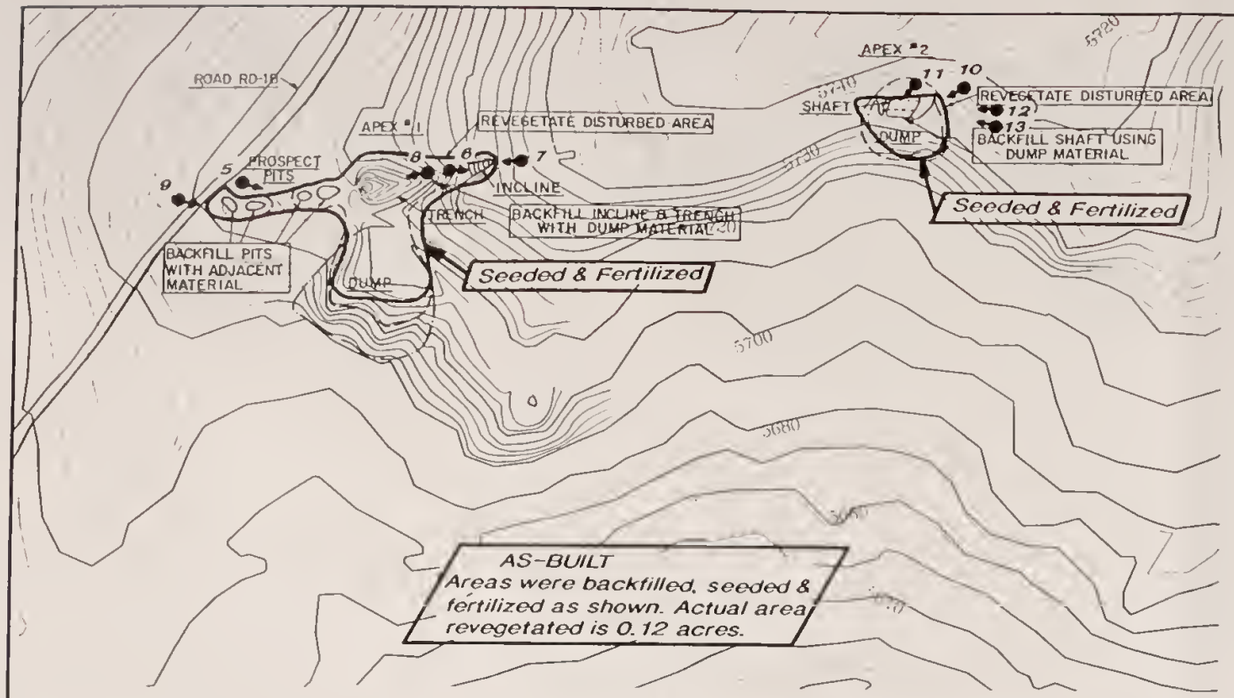
SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE October 1994
DRAWN BY OLD
APPROVED BY DM
REVISIONS
NO DATE BY
SHEET NO 1 of 20

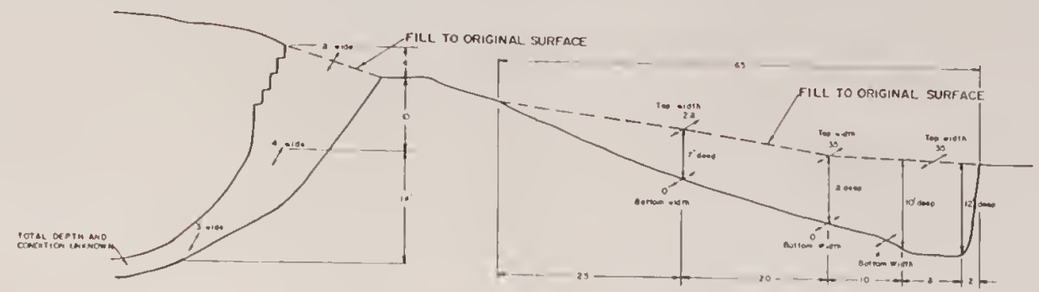
AS-BUILT DRAWING
PHOTO INDEX



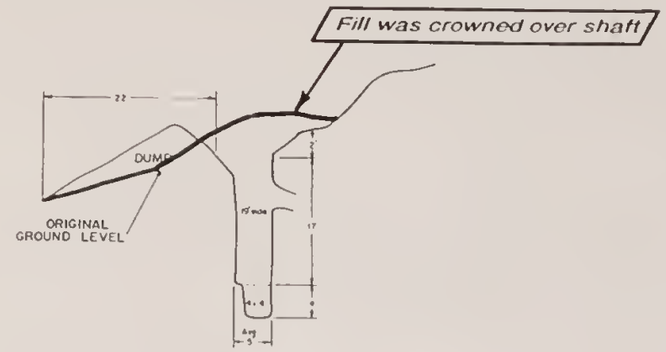
AS-BUILT DRAWING
PHOTO INDEX



PLAN VIEW OF APEX SITE



CROSS SECTION THROUGH APEX #1 INCLINE & TRENCH LOOKING SOUTH



CROSS SECTION THROUGH APEX #2 SHAFT LOOKING WEST

CONSTRUCTION PHOTOS

View of shallow prospect pits with their associated dumps.

View of Apex #1 trench.

Looking across Apex #1 incline, trench and pit toward the access road.

View of Apex #2 shaft.

View of Apex #1 showing dump, trench & incline.

Looking into the Apex #1 incline.

APEX SITE WORK DESCRIPTION

Backfill Mine Openings - The Apex #1 inclined shaft, trench and four pits will be backfilled to the surface using material from the dump which is less than 100 feet away. It is estimated that the inclined shaft will require 60 cubic-yards of backfill, the trench will require 280 cubic-yards of backfill, and the four prospect pits will require 15 cubic-yards of backfill. All backfill surfaces will be graded to blend with the surrounding contours. Areas on the dump which are disturbed for borrow excavation will be regraded with maximum 2H 1V slopes.

The Apex #2 shaft will be backfilled to the surface using material from the associated dump and from the adjacent area. It is estimated that this vertical shaft will require 75 cubic-yards of backfill. The entire dump will be used in this operation. The area disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes should not exceed 2½H 1V.

Seed and Fertilize - The disturbed areas will be seeded and fertilized. Approximately 0.12 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre.

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS
321 W. PARK ST.
BUTTE, MT 59701

ARCH DUDDEN
2417 YALE ST.
BUTTE, MT 59701
PHONE 406-723-5802

SITE PLAN AND GENERAL LAYOUT

APEX SITE

NW 1/4 OF SECTION 15, T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
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SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

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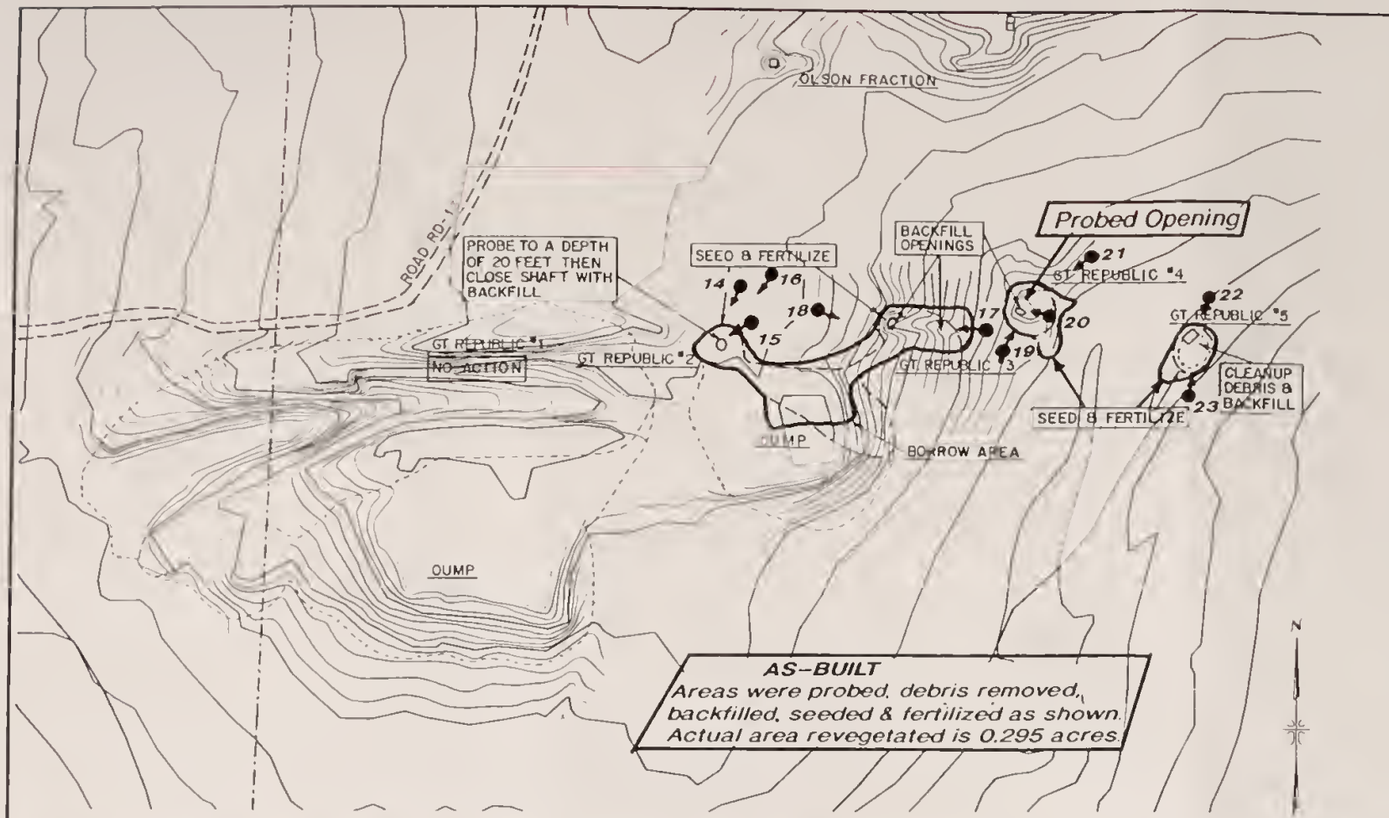
REVISIONS
NO DATE BY

SHEET NO 3 of 20

AS-BUILT DRAWING PHOTO INDEX



PLAN VIEW OF GREAT REPUBLIC SITE

GREAT REPUBLIC WORK DESCRIPTIONS

Backfill Mine Openings - The Great Republic #2 shaft will be backfilled using material from the nearby dump. Backfill will be mounded approximately 3-feet high over the opening. The area disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes on the backfill mound should not exceed 3H:1V. Areas on the dump which are disturbed by borrow excavation will be regraded with maximum 2H:1V slopes. Prior to backfilling, the shaft will be probed to a minimum depth of 20-feet. With anticipated additional induced subsidence produced by the probing operation, it is estimated that the total backfill quantity will be approximately 40 cubic-yards.

The Great Republic #3 cut and adit will be backfilled to the surface using material from the nearby dump. The backfill surface will be graded to blend with the surrounding contours. It is estimated that this opening will require 90 cubic-yards of backfill.

The incline at the Great Republic #4 will be completely backfilled. The surface excavation associated with the incline will then be filled and graded. Slopes on the backfill area will be 3H:1V or less.

Material from the adjacent dump will be used for backfill. Backfill requirements are estimated at 20 cubic-yards to fill the underground opening plus 40 cubic-yards to backfill and grade the surface cut.

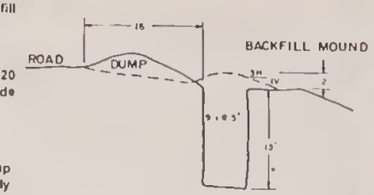
The Great Republic #5 shaft will be backfilled by using material from the adjacent dump and by borrowing from the surrounding area. Backfill will be mounded approximately 2-feet high over the opening. It is estimated that this opening will require 35 cubic-yards of backfill. The entire adjacent dump will be placed in the opening. The area disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes on the backfill mound and borrow area should not exceed 3H:1V.

Probe Mine Openings - Prior to backfilling the Great Republic #2 shaft, this opening will be probed to a depth of 20 feet below the collar. Probing the opening will be accomplished by digging out the material which has caved or otherwise collected in the underground opening. A backhoe or other equipment capable of probing the opening to a minimum depth of 20-feet will be used in this operation. Great Republic #3 was also probed.

Debris Cleanup - Prior to backfilling the Great Republic #5 shaft, trash in the opening will be removed so any drifting at the bottom of the opening can be filled. Nonbiodegradable trash will be crushed and buried in the opening. Wood may be disposed of by burning and dumping the ashes back into the opening. However, the Contractor may select to haul the debris in the shaft to the local landfill.

Seed and Fertilize - The areas disturbed by construction will be seeded and fertilized. Approximately0.295acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. After application, the reseeded area will be tracked. Raking may be substituted in areas that cannot be tracked.

View of the Great Republic #5 dump.



CROSS SECTION THROUGH GREAT REPUBLIC #5

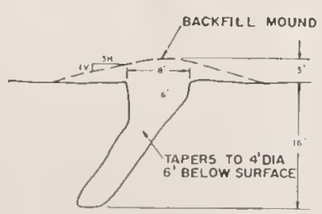
Great Republic #5 – Remove debris from shaft and backfill with 2' high mound.

CONSTRUCTION PHOTOS

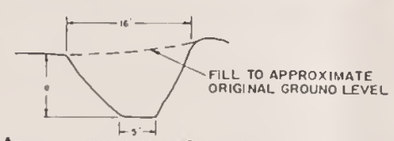
Great Republic #2 – Water flood the opening to induce additional subsidence. Then backfill with 3' high mound over the shaft.

Great Republic #3 – Use material from nearby mine dumps to completely backfill.

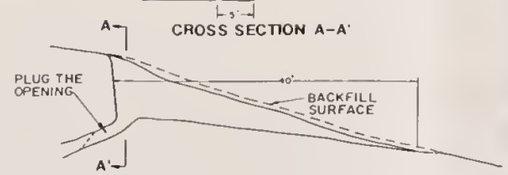
Great Republic #4 – Backfill 10'x4'x15' deep inclined shaft located inside surface cut. Then use material from nearby dumps to backfill surface cut with a 3 foot high mound. Grade to carry surface drainage around backfilled area.



CROSS SECTION THROUGH GREAT REPUBLIC #2



CROSS SECTION A–A'



LONGITUDINAL SECTION OF GREAT REPUBLIC #3

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS, INC.
321 W. PARK STREET
BUTTE, MT 59701

SITE PLAN AND GENERAL LAYOUT

GREAT REPUBLIC SITE

NW1/4 OF SEC 15 & NE1/4 OF SEC 16 T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

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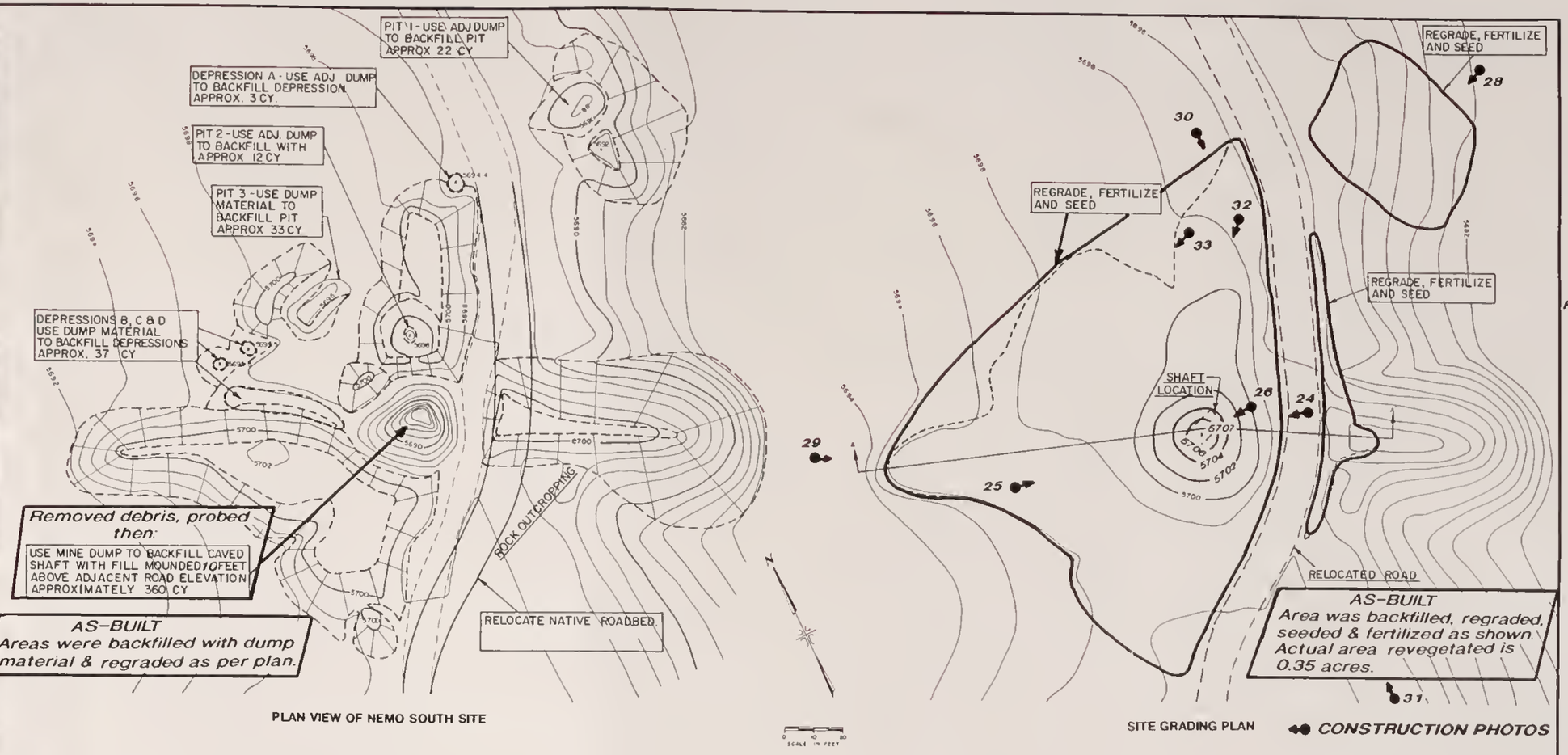
AS-BUILT DRAWING PHOTO INDEX

View looking east across site.

View of caved shaft, west dump borrow area and Depressions 'C' and 'D'.

Debris in bottom of shaft will be removed and hauled to landfill.

View of large dump on east side of road and north end of road relocation area.



PLAN VIEW OF NEMO SOUTH SITE

SITE GRADING PLAN

CONSTRUCTION PHOTOS

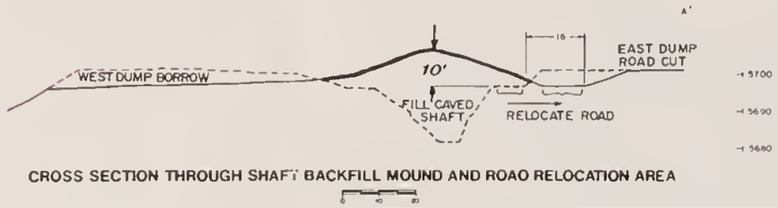
NEMO SOUTH SITE WORK DESCRIPTION

Debris Cleanup - Prior to backfilling the caved shaft, trash in the bottom of the subsidence depression must be removed and hauled to the county landfill. There is about one cubic-yard of debris.

Backfill Mine Openings - The Nemo South caved shaft will be backfilled using approximately 360 cubic-yards of fill from the adjacent dumps. Backfill over the shaft will be mounded approximately 6-feet above the elevation on the adjacent road. In addition, seven (7) pits or depressions on the site will be backfilled to the surface using material from the adjacent or nearby dumps. It is estimated that Pit-1 will require 22 cubic-yards of backfill; Pit-2 will require 12 cubic-yards of backfill; Pit-3 will require 33 cubic-yards of backfill; and Depressions A, B, C, and D will require a total of 40 cubic-yards of backfill. The location of each of these features is shown on the Site Topography. As indicated on the Site Grading Plan, disturbance of the large dump on the east side of the road will be limited to approximately 50 cubic-yards of excavation which is required for relocation of the road. All other dumps will be either totally or partially consumed for borrow. All areas disturbed by construction will be regraded to blend with the surrounding contours. Regraded slopes on the dump and the backfill mound should not exceed 2½H:1V. Site grading will reasonably conform with the line and grades shown on the Site Grading Plan and the Cross-Section Through the Shaft Backfill Mound and Road Relocation Area. It is estimated that the backfill operation will require the regrading of 0.321 acres.

Road Relocation - As shown on the Plan View and the Cross-Section Through the Shaft Backfill Mound and Road Relocation Area, the edge of the backfill mound is expected to encroach upon a portion of the existing site access road. Consequently 150-feet of this road will be relocated east of it's present location. The present road is an unsurfaced one-lane trail. The relocated section of road will be 12-feet wide and will be constructed on fill from the dump on the east side of the current road. It is estimated that there will be 50 cubic-yards of cut along the edge of the dump and around 20 cubic yards of fill. Cut slopes will be graded at 3H:1V and fill slopes will be graded at 2H:1V. The road profile in the relocated section will maintain a reasonably constant grade along it's entire length.

Seed and Fertilize - All disturbed areas except the running surface on the road will be seeded and fertilized. Approximately 0.35 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre.



CROSS SECTION THROUGH SHAFT BACKFILL MOUND AND ROAD RELOCATION AREA

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS
321 W. PARK STREET
BUTTE, MT 59701

SITE PLAN AND GENERAL LAYOUT

NEMO SOUTH SITE

SE 1/4 OF SECTION 9, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
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SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

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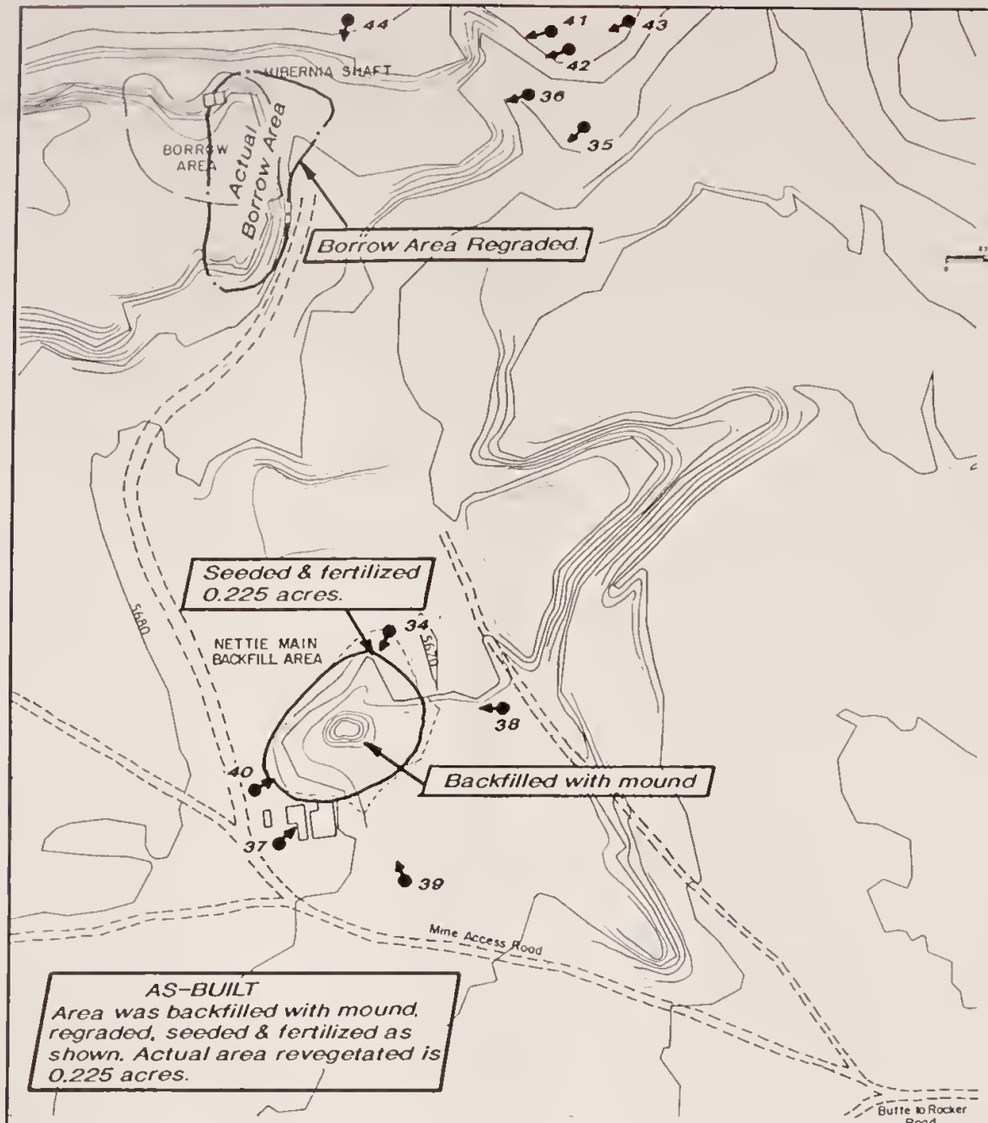
AS-BUILT DRAWING PHOTO INDEX



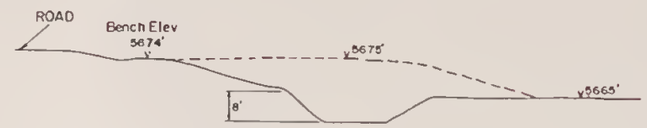
AS-BUILT
Area was backfilled with mound, regraded, seeded & fertilized as shown. Actual area revegetated is 0.225 acres.

PLAN VIEW OF NETTIE MAIN SITE

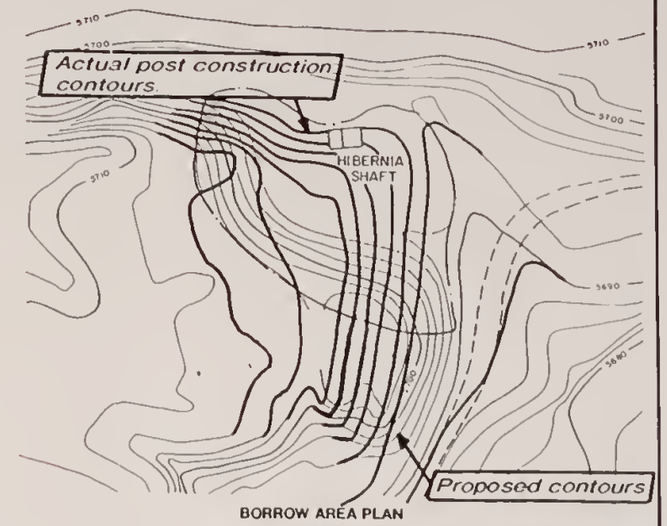
CONSTRUCTION PHOTOS

LAND & MINERAL OWNERSHIP

WEST BUTTE METALS, INC.
P.O. BOX 605
BUTTE, MT 59703



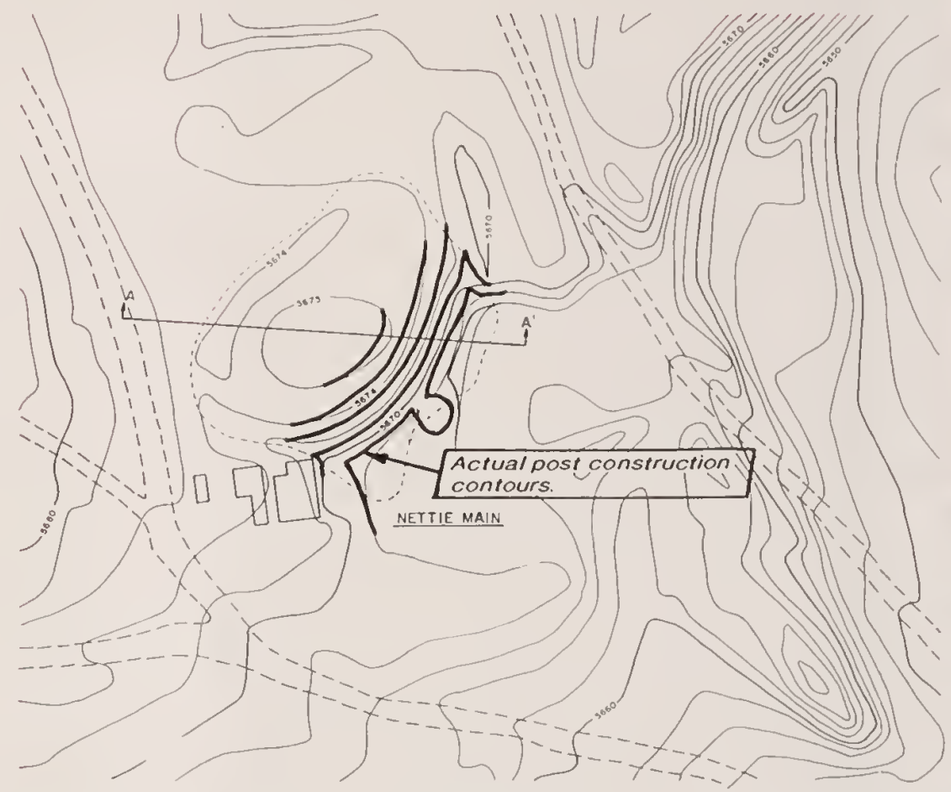
CROSS SECTION THROUGH NETTIE MAIN FILL



BORROW AREA PLAN

Looking north across caved shaft toward borrow area

Looking southwest at backfill area around collapsed shaft



BACKFILL GRADING PLAN

NETTIE MAIN SITE WORK DESCRIPTION

Backfill Mine Openings - The Nettie Main shaft will be backfilled using material from the northeast corner of the Hibernia dump. The backfill will be mounded 10-feet above the dump elevation on the southeast side of the shaft and about 1-feet above the existing ground elevation of the bench on the northwest side of the shaft as shown on the Cross-Section Through the Nettie Main Fill. Approximately 1600 cubic-yards of backfill will be required. All backfill surfaces will be graded to blend with the surrounding contours with slopes not exceeding 3H:1V. The final graded surface will conform reasonably closely with the grades and contours shown on the Backfill Grading Plan. It is estimated that 0.16 acres in the borrow area will be graded with maximum 2H:1V slopes. The final grades for the borrow area are shown on the Borrow Area Plan. The unit price bid for backfilling will include all excavation and haulage of backfill material from the Hibernia Dump, access development, dust suppression, and borrow area grading.

Seed and Fertilize - Borrow area seeding will not be required. However, the backfill area will be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre.

After application, the reseeded area will be tracked. Raking may be substituted in areas that cannot be tracked. Seed certifications and documentation of the seed mix must be submitted for approval prior to application.

SITE PLAN AND GENERAL LAYOUT

NETTIE MAIN SITE

NE 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

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Mining and Civil Engineers
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Phone: 406-259-2412

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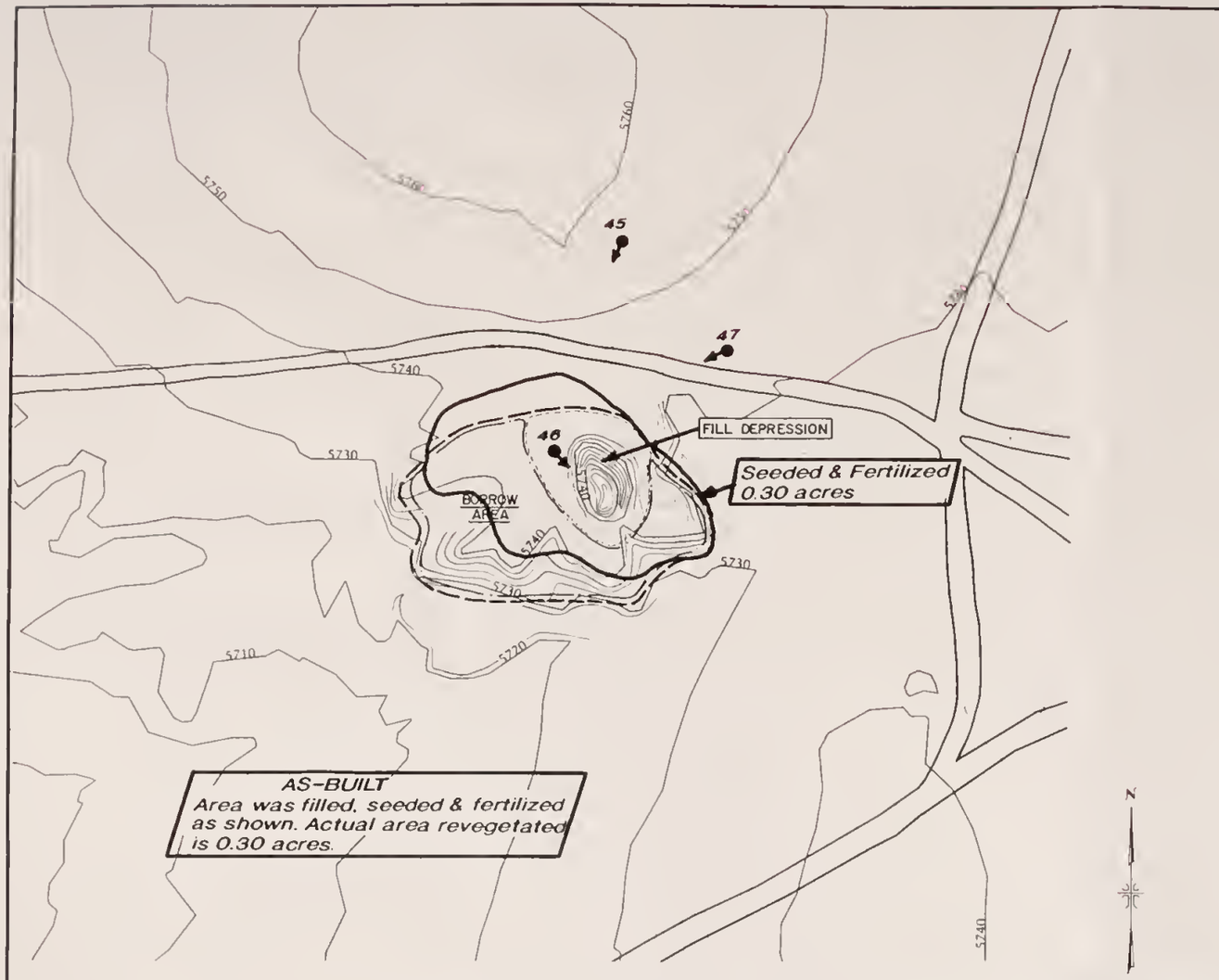
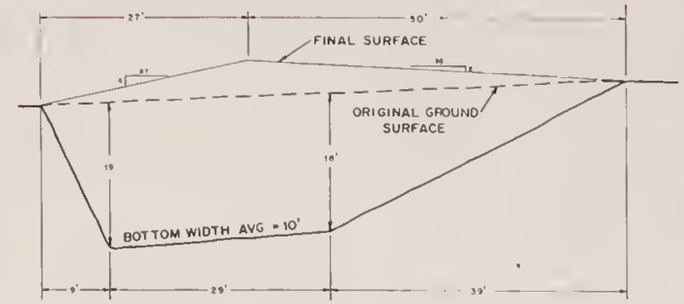
AS-BUILT DRAWING PHOTO INDEX



PLAN VIEW OF NETTIE INCLINE SITE



CROSS SECTION OF NETTIE INCLINE SITE

SCALE IN FEET

NETTIE INCLINE SITE WORK DESCRIPTION

Backfill Mine Openings - The subsidence depression associated with the caved Nettie Incline will be backfilled using material from the borrow area indicated on the adjacent dump. The backfill will be mounded over the opening and will be graded to provide positive drainage in all directions as shown on the cross-section. It is estimated that the depression and mound will require 1400 cubic-yards of backfill. All disturbed surfaces will be graded to blend with the surrounding contours. Areas on the dump which are disturbed for borrow will be regraded with maximum 2½ H 1 V slopes.

Seed and Fertilize - The disturbed areas will be seeded and fertilized.
Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre.
Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre.

CONSTRUCTION PHOTOS

View of dump and depression.

Close up view of subsidence depression.
Concrete will be buried in place.

LAND & MINERAL OWNERSHIP

WEST BUTTE METALS, INC.
P.O. BOX 605
BUTTE, MT 59703

SITE PLAN AND GENERAL LAYOUT

NETTIE INCLINE SITE

NW 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

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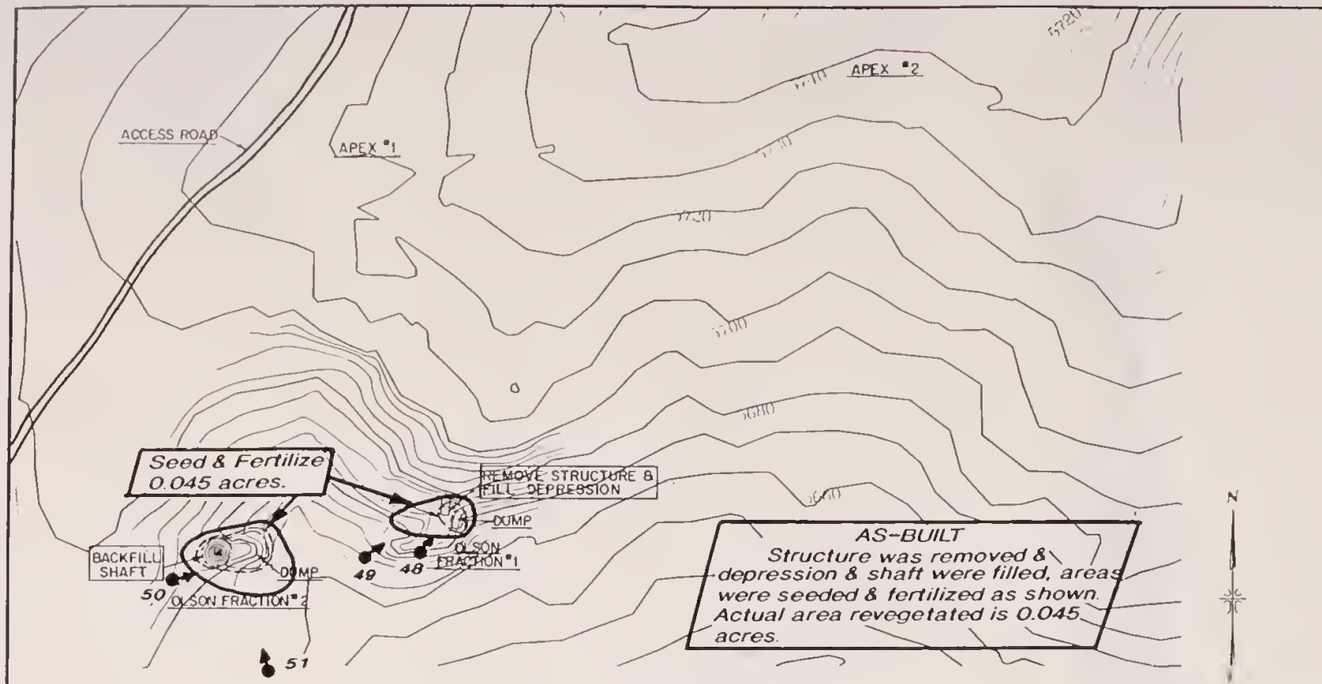
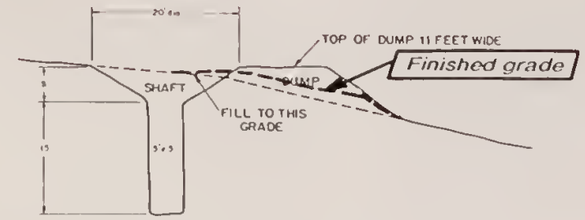
SHEET NO 7 of 20

AS-BUILT DRAWING
PHOTO INDEX



PLAN VIEW OF OLSON FRACTION SITE

CONSTRUCTION PHOTOS



CROSS SECTION THROUGH OLSON FRACTION #2

SCALE IN FEET

OLSON FRACTION SITE WORK DESCRIPTION

Structure Removal - The structure at the Olson Fraction #1 will be completely dismantled and removed from the site. The dismantled structure will be hauled to the local landfill. The structure consists of two 10 foot long 10" X 10" timbers supported by four posts. There is a 4' x 4' room at one end that is enclosed with lagging and tin. The dismantled structure will generate about 3 cubic-yards of debris.

Backfill Mine Openings - The Olson Fraction #1 opening will be backfilled to the surface with material from the adjacent mine dump. It is estimated that this opening will require 7 cubic-yards of backfill. The area disturbed by construction will be regraded to blend with the surrounding contours. The entire dump on the downhill side of the opening should be consumed in this operation. All regraded areas will be contoured with maximum 2½H 1V slopes.

The Olson Fraction #2 shaft will be backfilled to the surface with material from the adjacent mine dump. It is estimated that this opening will require 35 cubic-yards of backfill. The area disturbed by construction will be regraded to blend with the surrounding contours. The entire dump associated with the opening will be consumed in this operation. All regraded areas will be contoured with maximum 3H 1V slopes.

Seed and Fertilize - The disturbed areas will be seeded and fertilized.
Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre.
Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre.

View of Olson Fraction #2. Use entire dump to backfill 20 foot deep shaft.

View of Olson Fraction #1. Dismantle & remove the structure. Fill 7 cubic yard depression below structure.

LAND & MINERAL OWNERSHIP

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321 W. PARK ST.
BUTTE, MT 59701

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2106 DUCAN DR.
MISSOULA, MT 59801
406-728-7952

ROBERT & LILLIAN FIELD
7756 E. THIRD
SCOTTSDALE, AZ 85251

SITE PLAN AND GENERAL LAYOUT

OLSON FRACTION SITE

NW 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

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1413 4th Avenue North
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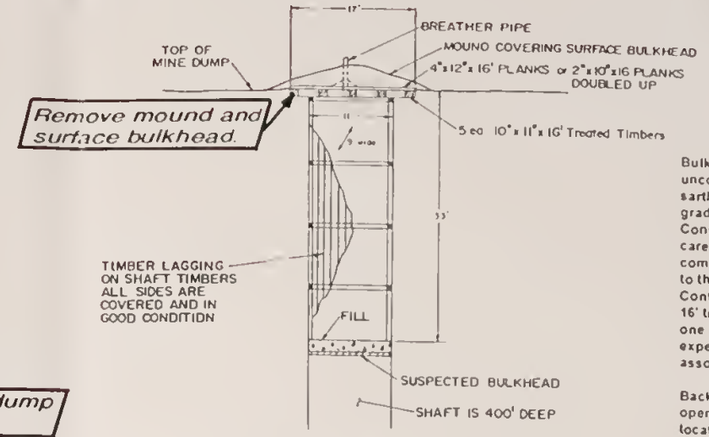
AS-BUILT DRAWING PHOTO INDEX

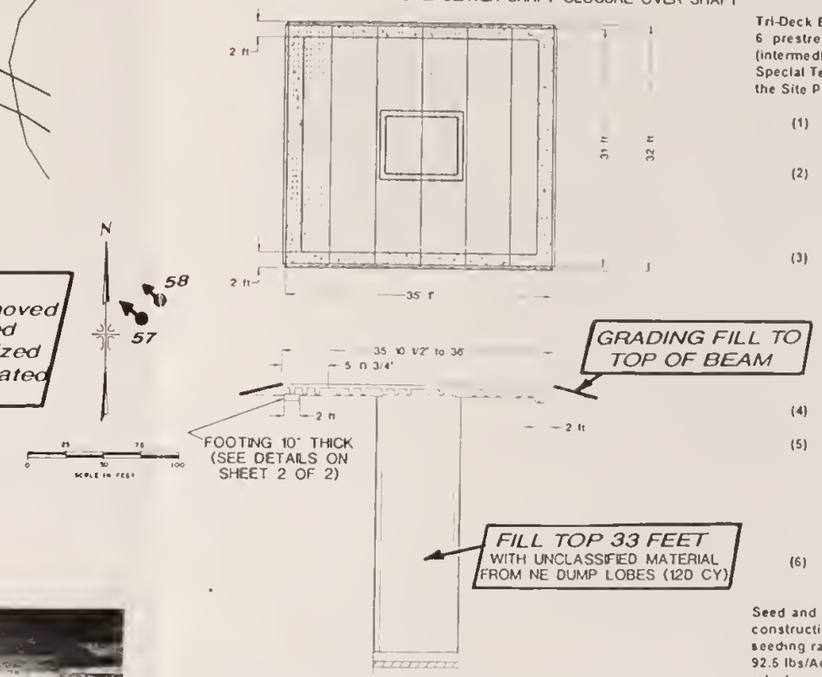
PLAN VIEW OF PLUTUS SITE

◄● *CONSTRUCTION PHOTOS*



CROSS SECTION SHOWING PRE-CONSTRUCTION

NOTE: CENTER SHAFT CLOSURE OVER SHAFT



SHAFT CLOSURE SECTION THROUGH LONG AXIS OF SHAFT

PLUTUS SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - The surface bulkhead on the Plutus shaft will be uncovered, dismantled, and removed from the site. Approximately 6 cubic-yards of earth which has been mounded over the bulkhead will be excavated and used as grading fill. The bulkhead is 16' x 17' and is constructed as indicated on the Pre-Construction Cross-Section. It will be completely dismantled. During this operation care will be taken to preserve the shaft collar and to avoid dropping bulkhead components into the shaft. All debris from this operation must be collected and hauled to the local landfill unless components are salvaged and removed from the site by the Contractor. It is estimated that the bulkhead debris will consist of five (5) 10" x 11" x 16' treated timbers, eight (8) 4" x 12" x 17' planks, twenty (20) 2" x 10" x 17' planks, and one (1) 6' x 6" dia. pipe. After the shaft has been uncovered, the Contractor at his expense will take all appropriate measures to protect the public from all hazards associated with the open shaft.

Backfill Mine Opening - The Plutus shaft is blocked 33-feet below the surface. The opening will be backfilled to the surface with material excavated from the dump lobes located northeast of the shaft. In addition, an area between the two dump lobes will be filled to the collar elevation of the shaft and recontoured to blend with the adjacent borrow areas on the dump. It is estimated that the shaft will require 120 cubic-yards and the fill area on the dump will require 40 cubic-yards of backfill. If the fill subsides inside the shaft during this operation, the backfill requirements will be increased. Areas on the dump which are disturbed by borrow excavation will be regraded with maximum 2½H:1V slopes after the Tri-deck beam shaft closure has been completed.

Tri-Deck Beam Shaft Closure - The Contractor will install a 31' x 36' shaft cover using 6 prestressed Tri-Deck concrete beams conforming with AASHTO HS20 loading (intermediate bridge sections). This installation will conform to all requirements in the Special Technical Specification for Tri-Deck Beam Shaft Closure (in Section III) and on the Site Plan Drawing. Work elements are as follows.

(1) Level a 32 ft x 36 ft area surrounding the shaft at the collar elevation. Approximately 20 cubic yards of cut and fill work.

(2) Excavate for footings (approx. 7 CY) and install forms for 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1½". The footing will be level and will be installed with the bottom 8-inches below grade.

(3) Construct reinforced concrete footing to level and support Tri-Deck Beams. Approximately 7.8 cubic-yards of 3000 PSI concrete will be required. Longitudinal reinforcement will consist of 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Additional reinforcement will be provided at all corners with #5 - 20" x 20" corner bars matched to the longitudinal reinforcement. Reinforcement will require approx. 600' of #5 bar, 150' of #3 bar, and 16 ea. #5 bar corners.

(4) Improve access as required to deliver beams.

(5) Furnish, deliver and install Tri-Deck Beams. Each beam will be 31 feet in length, 1' 4" in depth, and approximately 6 feet wide. Each beam will weigh approximately 21,000 pounds. The precast Tri-Deck beams will be laid edge to edge on the concrete footing and fastened in-place. Precast endwalls will be installed at the ends of each beam. See details on Sheet 2 of 2.

(6) Backfill around shaft closure to provide a slope.

Seed and Fertilize - All areas around the shaft closure which have been disturbed by construction. Utilize broadcast seeding rate of 48 lbs. of PLS/Ac and spread fertilizer at the rate of 92.5 lbs/Ac. After application, the reseeded area will be tracked or raked.

Approach to Plutus dump & shaft.

View showing existing timber bulkhead.

Earth mound placed over timber bulkhead after the inspection.

LAND & MINERAL OWNERSHIP

BUTTE PRECIOUS METALS
321 W. PARK ST.
BUTTE, MT 59701

MARGARET THOMAS
1620 43rd AVE. E, #3A
SEATTLE, WA 98112

ERIC NELSON
2106 DUCAN DR.
MISSOULA, MT
406-728-7952

SITE PLAN AND GENERAL LAYOUT

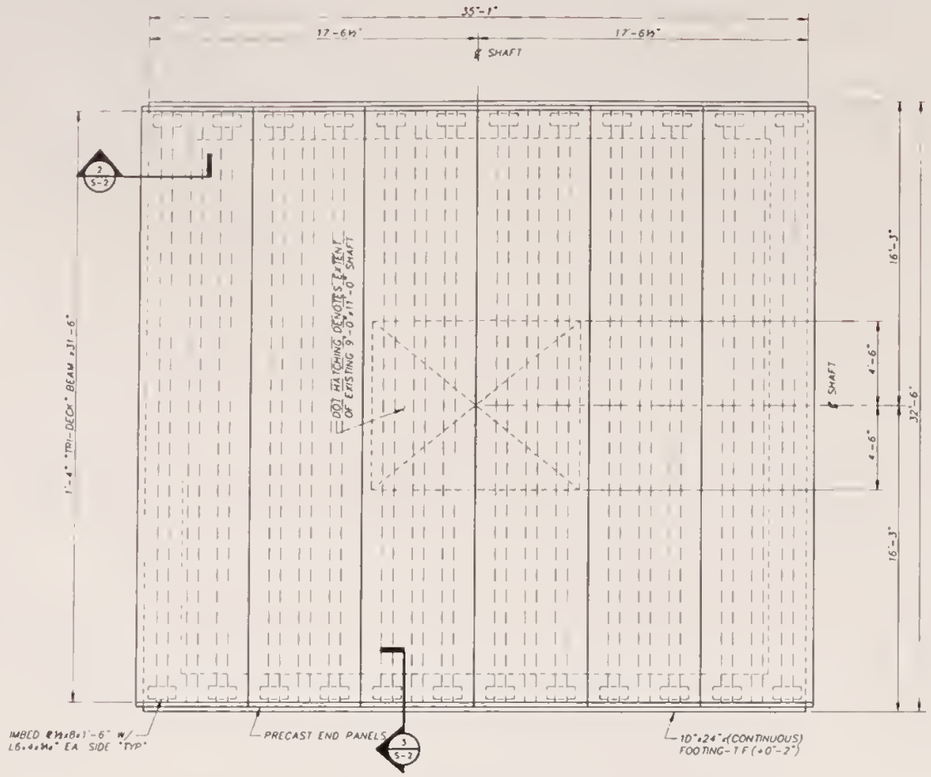
PLUTUS SITE
(1 OF 2)
NE 1/4 SECTION 15 T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

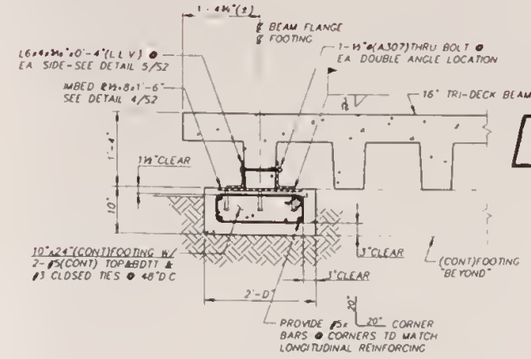
SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE September 1994
DRAWN BY DLD
APPROVED BY DM
REVISIONS
NO. DATE BY
SHEET NO 9 of 20

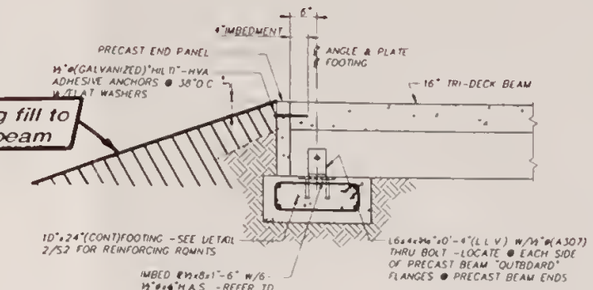
AS-BUILT DRAWING PHOTO INDEX



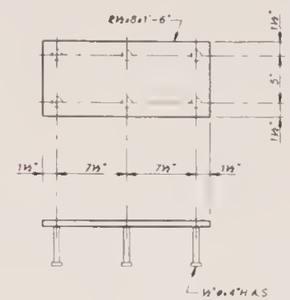
1 S-2 PLAN • SHAFT COVER



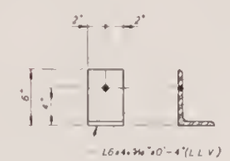
2 S-2 SECTION



3 S-2 SECTION



4 S-2 DETAIL
NOT TO SCALE



5 S-2 DETAIL
NOT TO SCALE

STRUCTURAL NOTES

1 DESIGN CRITERIA

PRECAST CONCRETE — DESIGN LOAD = 100 PSF

2 MATERIALS

STEEL SHAPES & PLATES (BLACK)	ASTM A36, Fy = 36KSI
WELDED CONNECTIONS	E70XX ELECTRODES
BOLTED CONNECTIONS	ASTM A307 BOLTS
CONCRETE	3000 PSI AT 28 DAYS
PRECAST CONCRETE	5000 PSI AT 28 DAYS
REINFORCING STEEL BARS	
#4 THRU #10 BARS	ASTM A615 - GRADE 60
#2 & #3 BARS	ASTM A615 - GRADE 40

3 FOOTING NOTES

1 ALL FOOTINGS ARE ASSUMED TO BEAR ON NATIVE SOILS IF QUESTIONABLE SOILS ARE ENCOUNTERED -CONTRACTOR IS TO NOTIFY OWNER IMMEDIATELY
2 ALL COORDINATION OF FOOTINGS, IMBEDS, AND PRECAST UNITS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR

4 CONCRETE

1 ALL CONCRETE SHALL BE READY MIXED AND SUPPLIED IN ACCORDANCE WITH SPECIFICATION REQUIREMENTS. NO WATER SHALL BE ADDED TO MIX AT JOB SITE
2 MINIMUM COVER REQUIREMENTS
CAST AGAINST EARTH = 3"
FORMED WALLS = 1 1/2"

5 REINFORCING STEEL

1 MINIMUM LAP REQUIREMENTS. 30 BAR DIAMETERS
2 CORNER BARS REQUIRED @ FOOTING LOCATIONS OF SIZE AND QUANTITY OF HORIZONTAL STEEL @ ALL CORNERS AND INTERSECTIONS

MONTANA WES KRIVONEN 7601E PROFESSIONAL ENGINEER

KRIVONEN ASSOCIATES, P.C.
STRUCTURAL CONSULTANTS

JOB NAME SHAFT COVER	DRAWN BY O.K	ENGINEER W.K	
LOCATION MONTANA	SCALE AS NOTED		
	DATE 3/27/95		
CONTRACTOR TO BE CHOSEN	JOB NUMBER	SHEET	
DESCRIPTION PLANS & DETAILS	484	S2	

SITE PLAN AND GENERAL LAYOUT

PLUTUS SITE
(2 OF 2)
NE 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY, MONTANA

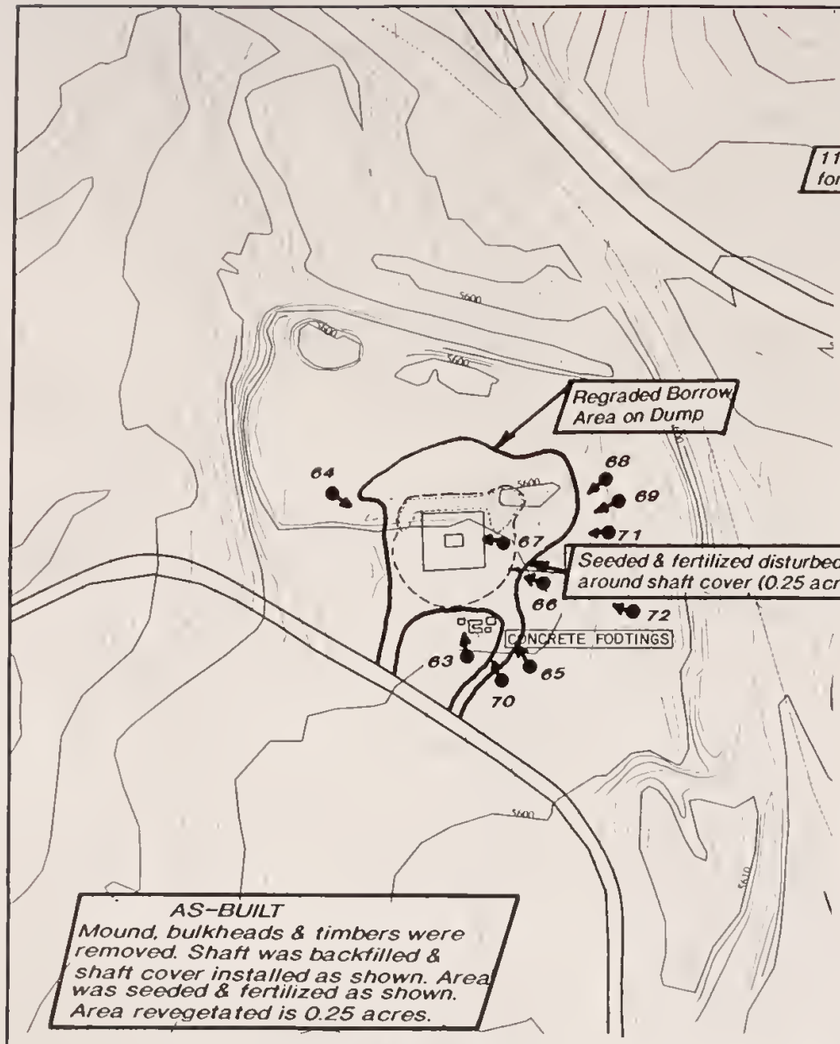
STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

REVISIONS NO.	DATE	BY

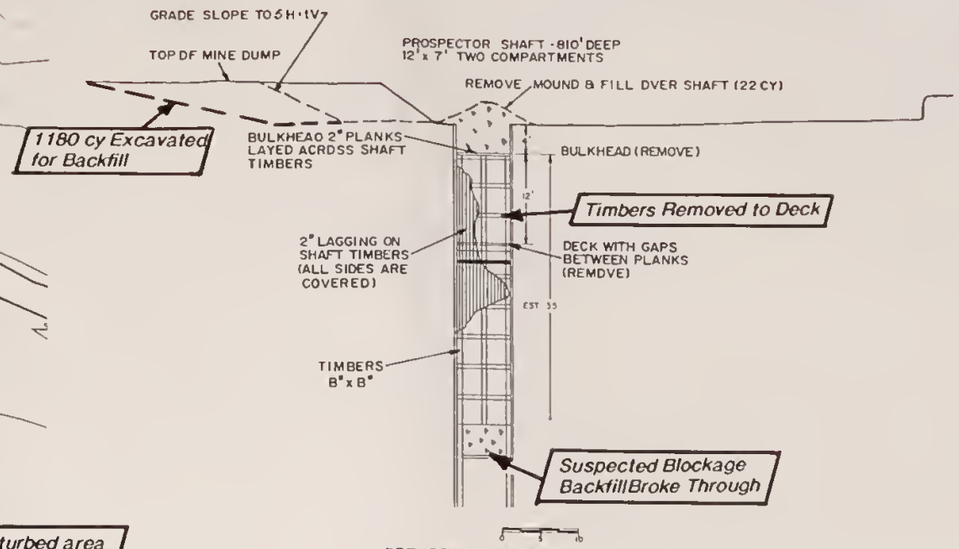
DATE
DRAWN BY
APPROVED BY
SHEET NO 10 of 20

AS-BUILT DRAWING
PHOTO INDEX

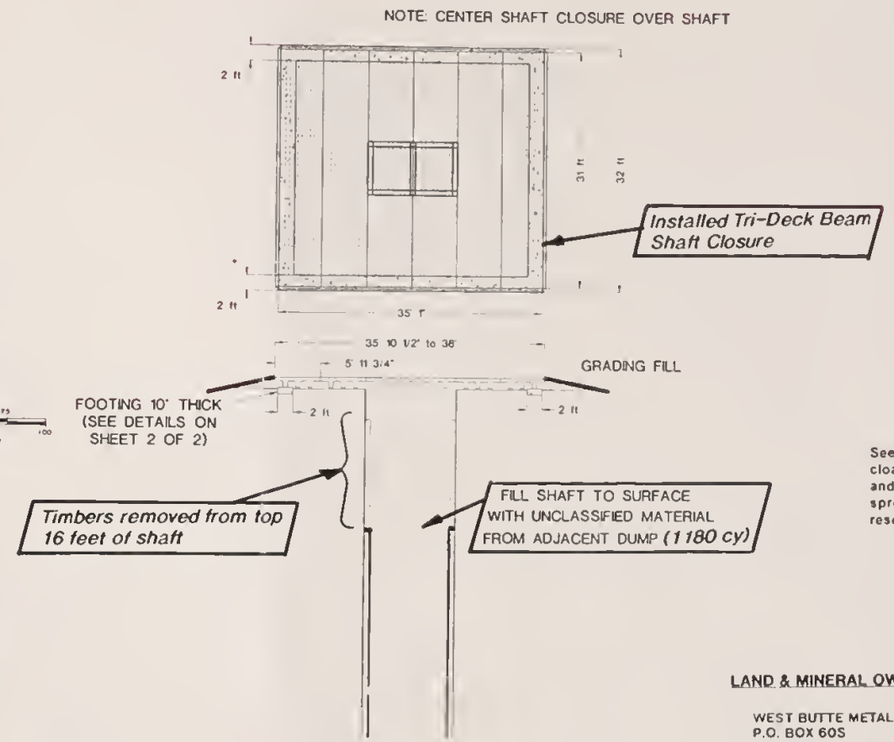


PLAN VIEW OF PROSPECTOR SITE

CONSTRUCTION PHOTOS



PRE-CONSTRUCTION CROSS SECTION



SHAFT CLOSURE SECTION THROUGH LONG AXIS OF SHAFT

PROSPECTOR SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - Remove approximately 22 cubic-yards of earth which has been mounded over the bulkhead situated four feet below the surface. Then remove the first bulkhead which consists of 2-inch planks laid across the first intact set of horizontal timbers inside the 12' x 7' shaft. Next remove a second deck consisting of planks laid loosely across the horizontal timbers at about 16-feet below the surface.

All debris from these operations must be collected and hauled to the local landfill unless salvaged and removed from the site.

Backfill Mine Opening -

The opening will be backfilled to the surface with approximately 1180 cubic-yards of material from the adjacent dump. Because the shaft is situated about 6-feet from the toe of the dump, material that would interfere with the cover installation must be used for backfill.

Tri-Deck Beam Shaft Closure - The Contractor will install a 31' x 36' shaft cover using 6 prestressed Tri-Deck concrete beams conforming with AASHTO HS20 loading (intermediate bridge sections). The installation will conform to all requirements in the Special Technical Specification for Tri-Deck Beam Shaft Closure (in Section III) and on the Site Plan Drawing. Work elements are as follows:

(1) Level a 32 ft x 36 ft area surrounding the shaft at the collar elevation. Approximately 20 cubic yards of cut and fill work.

(2) Excavate for footings (approx. 7 CY) and install forms for 2-foot wide by 10-inch thick concrete footing with outside dimensions of 32' x 35'1½". The footing will be level and will be installed with the bottom 8-inches below grade.

(3) Construct reinforced concrete footing to level and support Tri-Deck Beams. Approximately 7.8 cubic-yards of 3000 PSI concrete will be required. Longitudinal reinforcement will consist of 2-#5 bars at top and bottom with #3 bar used for closed ties on 48" centers. Additional reinforcement will be provided at all corners with #5 - 20" x 20" corner bars matched to the longitudinal reinforcement. Reinforcement will require approx. 600' of #5 bar, 150' of #3 bar, and 16 ea. #5 bar corners

(4) Improve access as required to deliver beams.

(5) Furnish, deliver and install Tri-Deck Beams Each beam will be 31 feet in length, 1' 4" in depth, and approximately 6 feet wide. Each beam will weigh approximately 21,000 pounds. The precast Tri-Deck beams will be laid edge to edge on the concrete footing and fastened in-place. Precast endwalls will be installed at the ends of each beam. See details on Sheet 2 of 2

(6) Backfill around shaft closure to provide a slope.

Seed and Fertilize - The excavated portion of the dump and all areas around the shaft closure which have been disturbed by construction will be seeded and fertilized. Utilize broadcast seeding rate of 48 lbs. of PLS/Ac and spread fertilizer at the rate of 92.5 lbs/Ac After application, the reseeded area will be tracked or raked

Shaft is located below the earth mound.

Shaft (12'x7') has a bulkhead made of 2" planks approximately 4' below the surface

LAND & MINERAL OWNERSHIP

WEST BUTTE METALS, INC.
P.O. BOX 605
BUTTE, MT 59703

SITE PLAN AND GENERAL LAYOUT

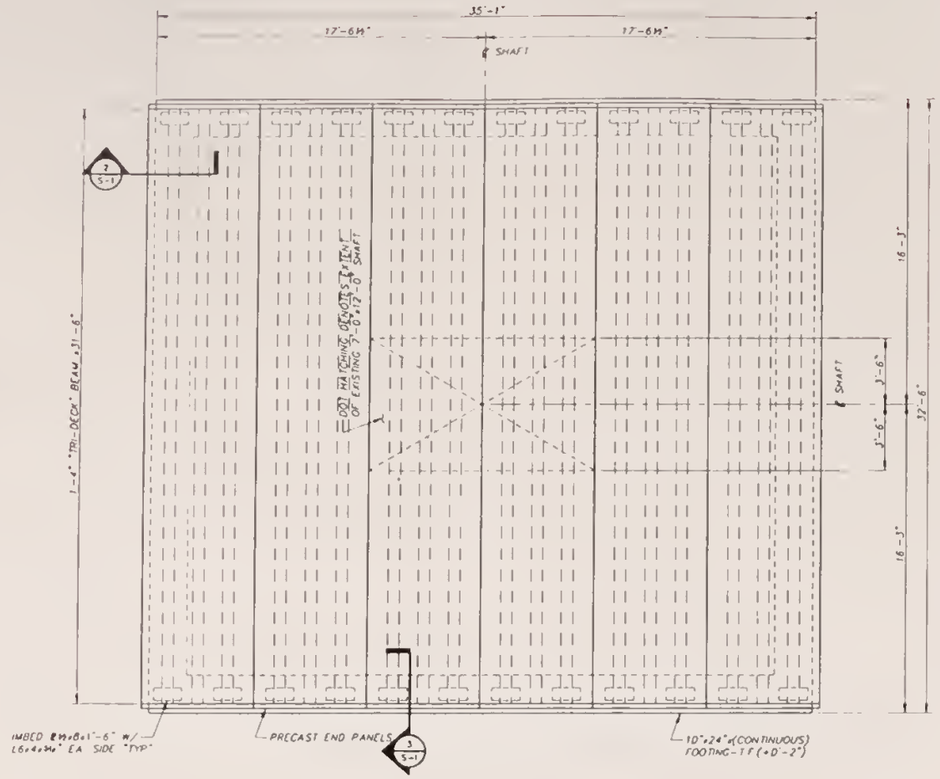
PROSPECTOR SITE
(1 OF 2)
NE 1/4 SE 1/4 OF SECTION 15, T3N, R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

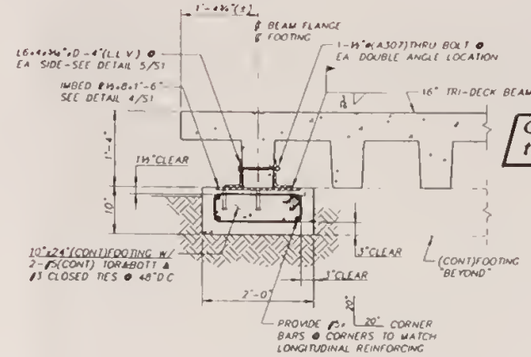
DATE October 1994
DRAWN BY DLO
APPROVED BY DM
REVISIONS
NO DATE BY
SHEET NO 11 of 20

AS-BUILT DRAWING PHOTO INDEX



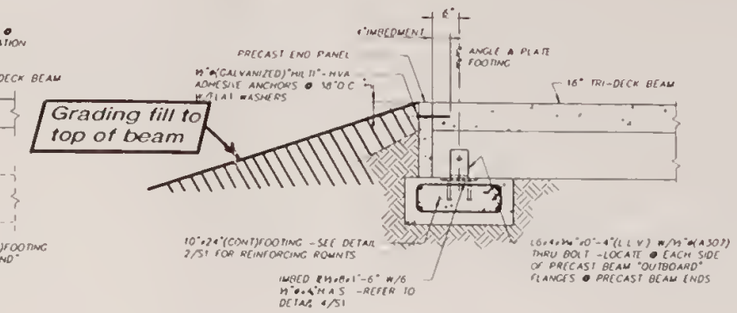
1 S-1 PLAN • SHAFT COVER

INCHES 0 12 24 48 96



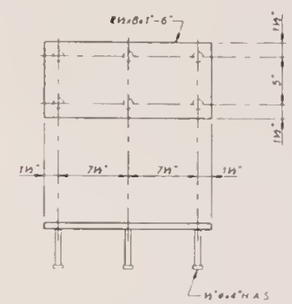
2 S-1 SECTION

INCHES 0 4 8 16



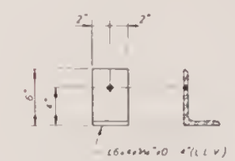
3 S-1 SECTION

INCHES 0 4 8 16



4 S-1 DETAIL

NOT TO SCALE



5 S-1 DETAIL

NOT TO SCALE

STRUCTURAL NOTES

1 DESIGN CRITERIA

PRECAST CONCRETE — DESIGN LOAD = 100 PSF

2 MATERIALS

STEEL SHAPES & PLATES (BLACK)	ASTM A36, F_y = 36KSI
WELDED CONNECTIONS	E70XX ELECTRODES
BOLTED CONNECTIONS	ASTM A307 BOLTS
CONCRETE	3000 PSI AT 28 DAYS
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3 FOOTING NOTES

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4 CONCRETE

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CAST AGAINST EARTH = 3"
FORMED WALLS = 1 1/2"

5 REINFORCING STEEL

1 MINIMUM LAP REQUIREMENTS 30 BAR DIAMETERS
2 CORNER BARS REQUIRED @ FOOTING LOCATIONS OF SIZE AND QUANTITY OF HORIZONTAL STEEL @ ALL CORNERS AND INTERSECTIONS

MONTANA WES KRIVONEN 7501E REGISTERED PROFESSIONAL ENGINEER

KRIVONEN ASSOCIATES, P.C.
STRUCTURAL CONSULTANTS

JOB NAME SHAFT COVER	DRAWN BY O.K.	ENGINEER W.K.
LOCATION MONTANA	SCALE AS NOTED	
	DATE 3/27/95	
CONTRACTOR TO BE CHOSEN	JOB NUMBER 484	SHEET S1
DESCRIPTION PLANS & DETAILS		

SITE PLAN AND GENERAL LAYOUT

PROSPECTOR SITE

(2 OF 2)

NE1/4 SE1/4 OF SECTION 15, T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE
DRAWN BY
APPROVED BY
REVISIONS
NO. DATE BY

SHEET no. 12 of 20

AS-BUILT DRAWING
PHOTO INDEX

ATOMIC SITE WORK DESCRIPTION

Structure Removal - The headframe at the Atomic will be completely dismantled and removed from the site. The dismantled structure will be hauled to the local landfill. It consists of five 7' to 12' long timbers (8"-12" square) and two short timber pilings. Any salvageable materials will become the Contractor's property.

Bulkhead and Shaft Timber Removal - The surface deck (approx. 8' x 10') and the top 13 feet of timbers and wood planks lining the shaft must be removed from the shaft. All debris from these operations must be collected and hauled to the local landfill. The Shaft Cross-Sections show the construction of the shaft.

Debris Cleanup - Debris (approx. 8 CY) in the cut below the shaft must be removed and hauled to the county landfill.

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area must be stripped of vegetation and other objectionable materials. The refuse resulting from this operation will be treated as debris and will be hauled to the local landfill. It is anticipated that only a portion of the total area will be affected by this operation. An estimated 0.062 acres will be affected.

Salvage and Replace Topsoil - All recoverable topsoil must be stripped from the area which will be disturbed by site grading and backfilling. soil will be salvaged, stockpiled, and later replaced on the regraded area. Cover soil will be respread evenly over the entire regraded area and brought to a friable condition ready for seeding.

Backfill Mine Openings - The shaft will be eliminated partially by regrading and partially by backfilling with material borrowed from the adjacent area (approx. 15 CY). It will be regraded to the approximate contours shown on the Regrading Plan.

The surface cut between the road and the shaft will be utilized as a borrow source for the Railroad Adit 2 Site and will supply approximately 40 cubic-yards of material from it's southeast corner. (See cut isopach on the Regrading Plan.) The surface cut will be backfilled as part of the Atomic Site reclamation. It is estimated that 60 cubic-yards of backfill will be required to recontour the cut with maximum 3H:1V slopes as shown on the Regraging Plan.

Adit Demolition and Backfilling - As shown on the Adit Cross-Section, the first 56 feet of the adit will be completely demolished by digging out the adit timbers and lagging which are in the caved area or are uncovered by excavation. The adit excavation will begin at the portal where the adit roof is partially caved and extend into approximately 6 feet of cover at the end. It will not be necessary to remove 100-percent of the timbers from the excavation; however, timbers left in the opening must not interfere with effective backfilling and grading. Mine timbers and other debris removed from the adit will be hauled to the local landfill. It is anticipated that approximately 75 cubic-yards of excavation will be required to uncover and remove the mine timbers.

After the mine timbers have been removed, the Contractor will backfill and regrade the trench created by the collapse and excavation of the adit. Approximately 90 cubic-yards of material will be required to backfill the resulting trench to the grades specified on the Grading Plan. The material will be obtained by replacing the material excavated during adit demolition and by regrading the adjacent area. The areas around the adit, shaft and surface cut will be blended to form a broad swale draining toward the road. Grades will not exceed 3H:1V. The longitudinal profile of the swale will make a smooth transition from the original ground elevation at the head of the disturbed area to the road elevation at the bottom. The regraded contours will blend smoothly with the surrounding terrain.

Probe Mine Openings - Prior to backfilling the adit, the end will be probed for a distance of 5 feet to determine if the adit is completely blocked. Probing the opening will be accomplished by digging out a sufficient amount of the caved material to determine if the caved portion of the adit extends beyond this distance. Mine timbers and other debris that may be choking the adit will be removed and hauled to the local landfill. If the adit is determined to be sufficiently caved, the excavation will be backfilled as part of this operation. If the adit is reopened, an adit closure will be required.

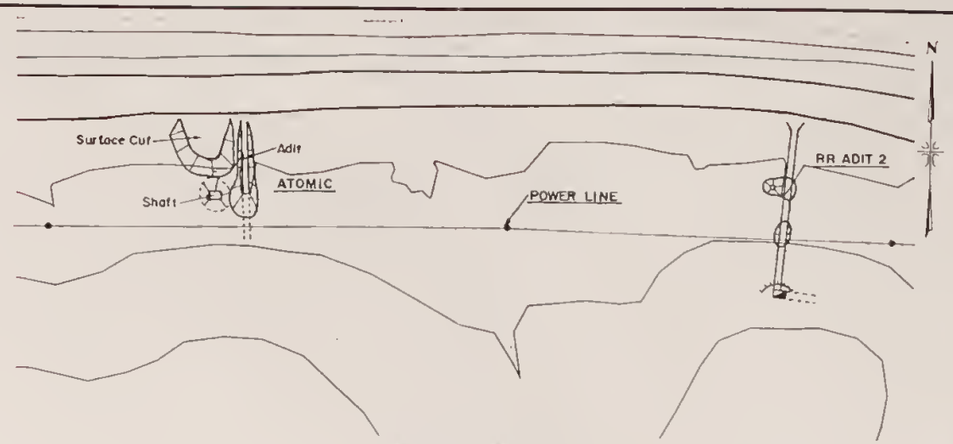
Fertilize, Seed, and Mulch - All areas disturbed (including roads and stockpile areas) will be seeded, fertilized and mulched.

Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed (PLS) per acre, which is twice the application rate for drill seeding. Fertilizer will be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch shall be applied at a rate of 3,000 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free".

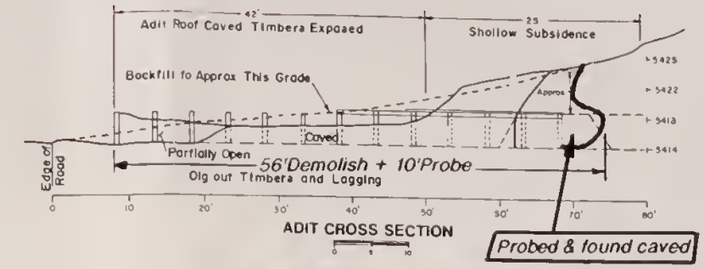
Straw Bales - The constructed swale will require straw bale erosion control measures as shown on the Grading Plan. Approximately 5 bales will be required. Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads. Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free". Installation of the straw bales shall consist of two staggered rows across the full width of the swale. The straw bales shall be embedded into the ground a minimum of six (6) inches. Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

LAND & MINERAL OWNERSHIP

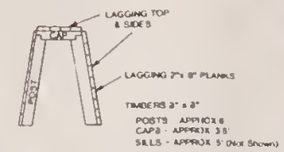
R.W. RICHTER & R.H. KEARNEY
RFD #2, P.O. BOX 23S
BUTTE, MT 59701
PHONE 406-792-8286



PLAN VIEW OF ATOMIC SITE

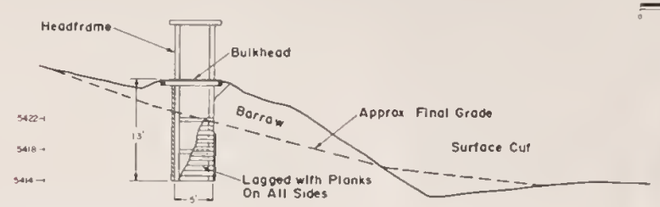


ADIT CROSS SECTION



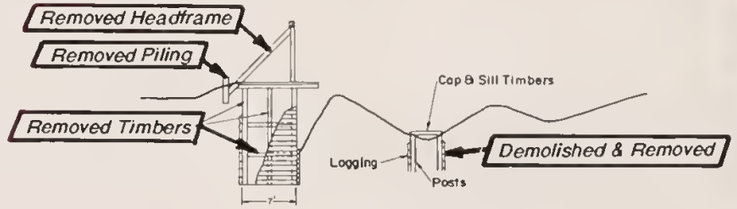
TYPICAL ADIT TIMBER CONSTRUCTION

Portal on Atomic adit.



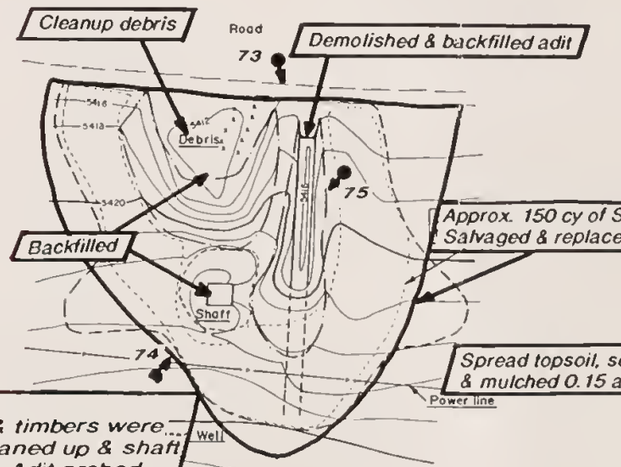
Timbers exposed on side of shaft.

View of headframe and bulkhead.

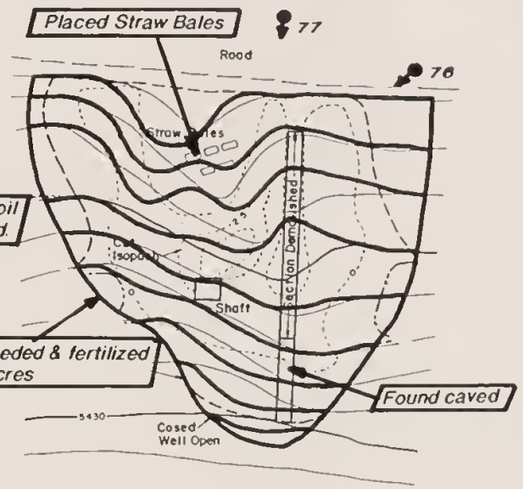


SHAFT CROSS SECTION

Remove debris in surface cut.
Use cut for Railroad Adit 2 borrow.



SITE PLAN VIEW



GRADING PLAN

AS-BUILT
Headframe, piling, & timbers were removed. Debris cleaned up & shaft backfilled as shown. Adit probed, found caved, and backfilled. Straw bales were placed and area was seeded & fertilized. Area revegetated is 0.15 acres.

CONSTRUCTION PHOTOS

SITE PLAN AND GENERAL LAYOUT

ATOMIC SITE

NW 1/4 OF SECTION 22, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

DATE: October 1994
DRAWN BY: DLO
APPROVED BY: DM
REVISIONS: NO. | DATE | BY
SHEET NO. 13 of 20

AS-BUILT DRAWING PHOTO INDEX

RAILROAD ADIT 1 SITE WORK DESCRIPTION

Clear and Grub - In order to prepare the site for topsoil salvage, the area required for adit demolition and backfilling must be stripped of vegetation and other objectionable materials. The refuse resulting from this operation will be treated as debris and will be hauled to the local landfill.

Salvage and Replace Topsoil - All recoverable cover soil must be stripped from the area which will be disturbed by the adit demolition and backfilling operation. stockpiled, and later replaced on the regraded area. Cover soil will be respread evenly over the regraded area and will be brought to a friable condition suitable for seeding.

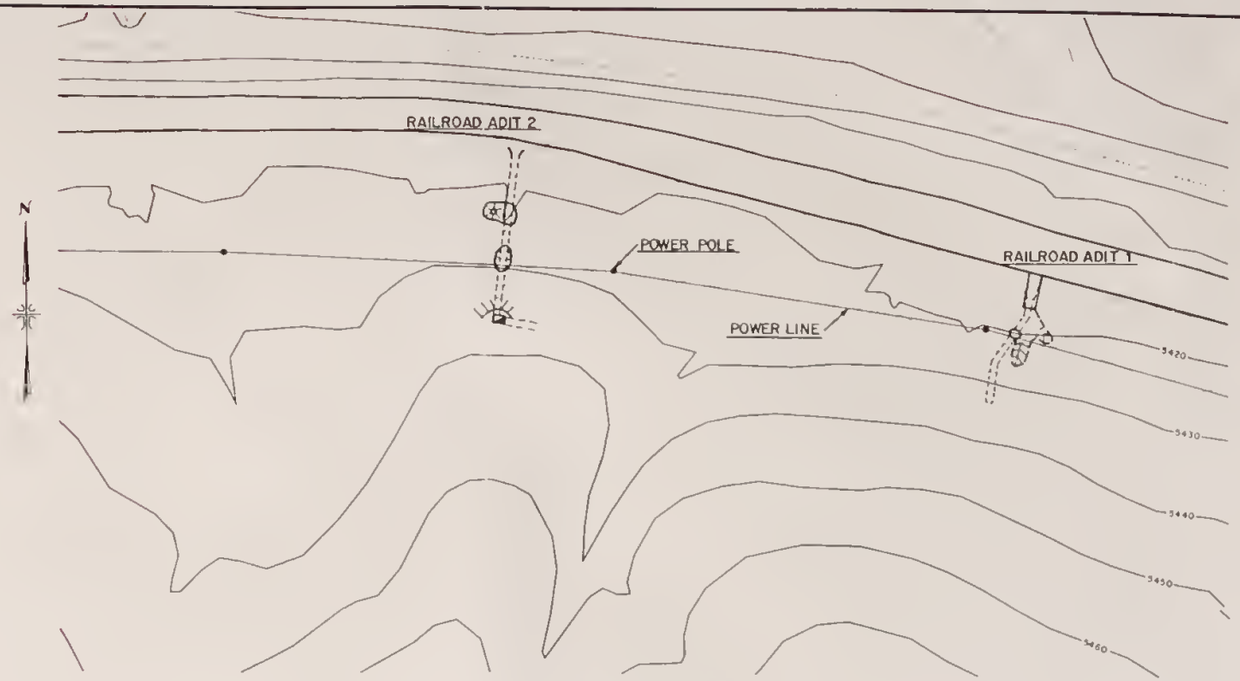
Adit Demolition and Backfilling - As shown on the Cross-Section and Regrading Profile, the first 55 feet of the adit will be completely demolished by digging-out the timbers and lagging which provide support to the roof and walls. The adit excavation will begin at the portal where there is less than 1 foot of cover over the adit roof and extend into 11 feet of cover at the end. Since the adit is 6-feet high, the maximum depth of the excavation will be around 17 feet. In areas where over 10-feet of backfill will be replaced, it will not be necessary to remove 100-percent of the timbers from the excavation. However, any timbers left in the opening must not interfere with effective backfilling. Mine timbers and other debris removed from the adit will be hauled to the local landfill.

After the mine timbers have been removed, the Contractor will backfill and regrade the subsidence features and the trench created by the collapse and excavation of the adit. The area will be graded as a broad swale draining toward the road. Sideslopes along the swale will not exceed 3H:1V. The longitudinal profile of the swale will make a smooth transition from the original ground elevation at the head of the disturbed area to the road elevation at the bottom. The final grade along the bottom of the swale will be reasonably close to the profile shown on the Cross-Section and Regrading Profile. It is anticipated that approximately 175 cubic-yards of excavation will be required to uncover and remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades specified.

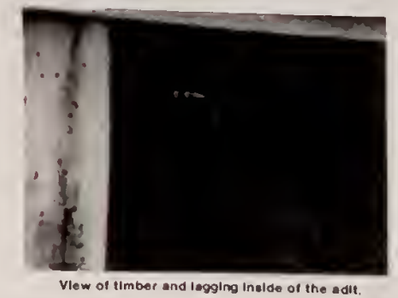
Adit Closure - At a distance of about 55 feet in from the portal, it is anticipated that adit demolition will be forced to stop because the remainder of the adit will be under solid rock. At this point, a 5-ft long backfill plug will be installed inside the adit to seal the underground opening and to prevent subsidence. Plug length is measured along the roof from the brow of the opening back to the point where the top of the plug begins to slope down from the roof of the opening. The plug must provide complete blockage of the opening over the specified plug length. It is estimated that this plug will require 11 cubic-yards of backfill.

Fertilize, Seed, and Mulch - The total affected area including construction roads and stockpile areas must be graded then fertilized, seeded and mulched. Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed per acre, which is twice the application rate for drill seeding. Fertilizer will be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch shall be applied at a rate of 3,000 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free".

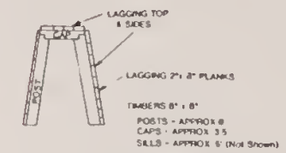
Straw Bales - All constructed swales will require straw bale erosion control measures as shown on the site plan. Approximately 7 bales will be required. Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads. Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free". Installation of the straw bales shall consist of two staggered rows across the full width of the swale. The straw bales shall be embedded into the ground a minimum of six (6) inches. Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.



PLAN VIEW OF RAILROAD ADIT 1 SITE

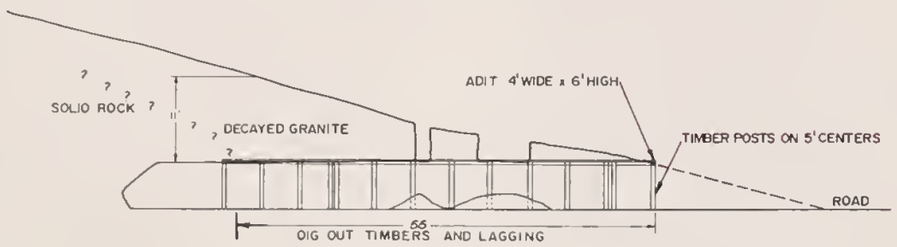


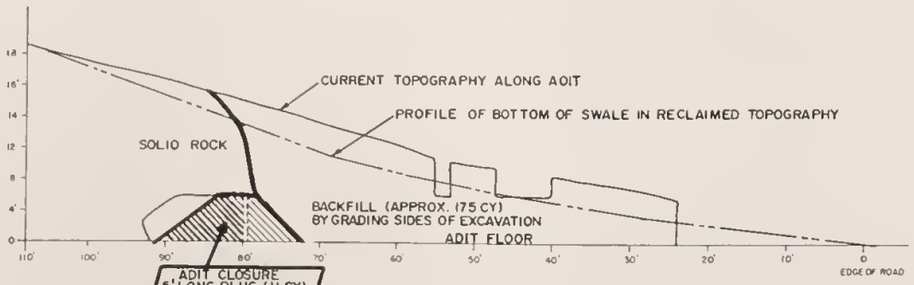
View of timber and lagging inside of the adit.



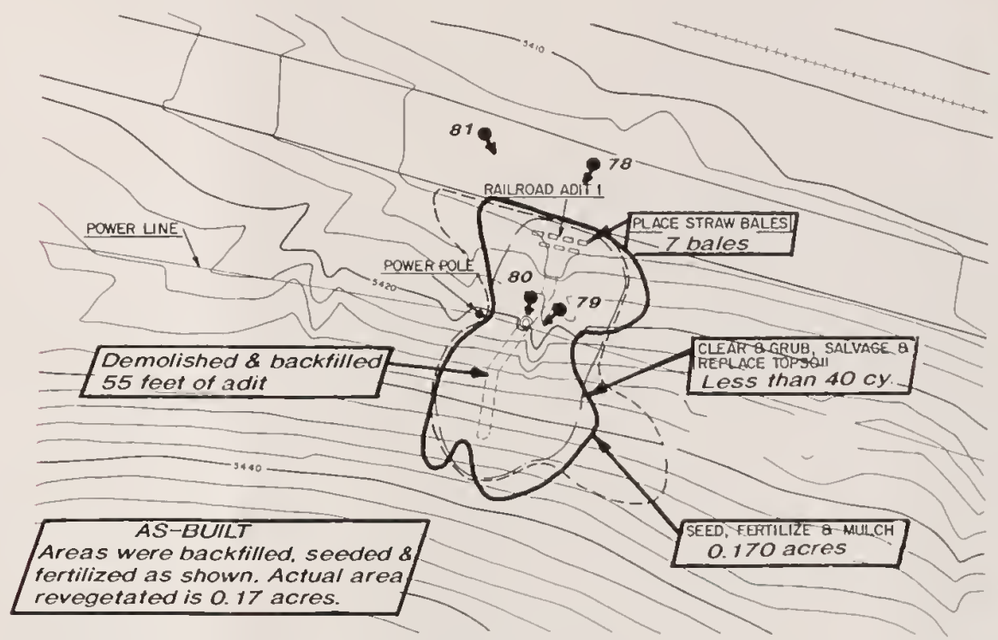
TYPICAL ADIT TIMBER CONSTRUCTION

Railroad Adit 1 portal and power pole.





CROSS SECTION AND REGRADING PROFILE



SITE PLAN

CONSTRUCTION PHOTOS

LAND & MINERAL OWNERSHIP

R.W. RICHTER & R.H. KEARNEY
RFD #2, P.O. BOX 235
BUTTE, MONTANA 59701
PHONE 406-792-6288

SITE PLAN AND GENERAL LAYOUT

RAILROAD ADIT 1

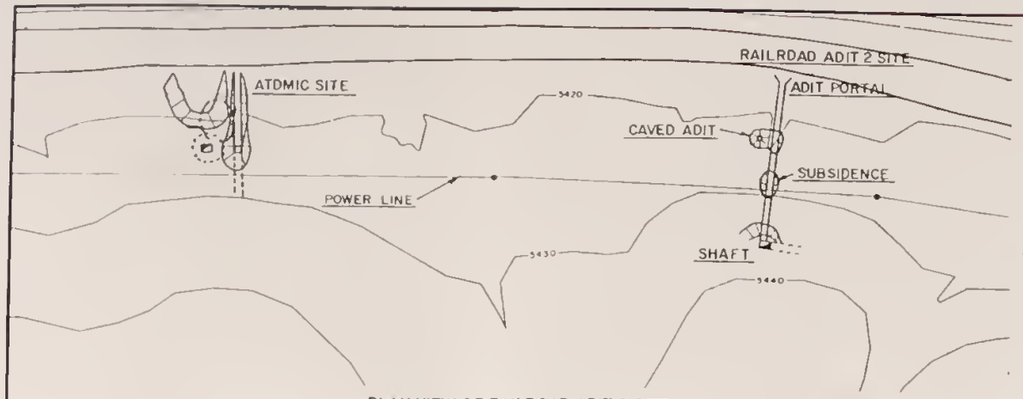
NW 1/4 OF SECTION 22, T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

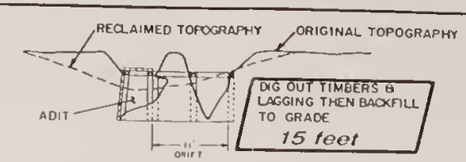
DATE October 1994
DRAWN BY DLO
APPROVED BY CM
REVISIONS
NO. DATE BY
SHEET NO. 14 of 20

AS-BUILT DRAWING PHOTO INDEX

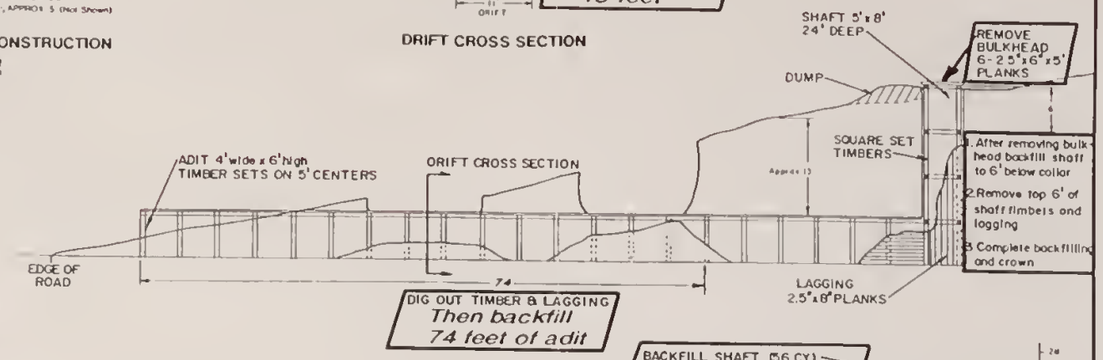


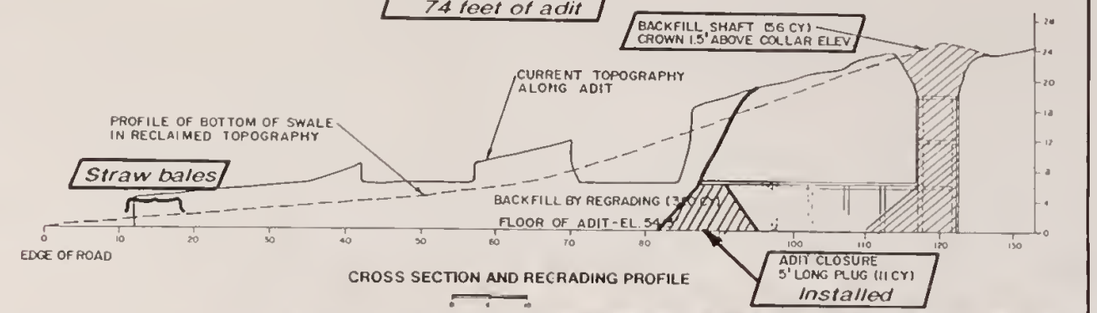
PLAN VIEW OF RAILROAD ADIT 2 SITE

TYPICAL ADIT TIMBER CONSTRUCTION



DRIFT CROSS SECTION





CROSS SECTION AND RECRADING PROFILE

RAILROAD ADIT 2 SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - At the shaft, the surface bulkhead (6 planks nailed to the shaft collar) and the top 6 feet of shaft timbers and lagging which line the shaft must be removed. All debris from these operations must be collected and hauled to the local landfill. The shaft timbers should not be removed until the bottom 18-feet of the shaft has been backfilled.

Backfill Mine Openings - The shaft will be backfilled with the fill material mounded 1½-feet above the current collar elevation. The backfill crown will be graded to drain in all directions and will not have greater than 3H:1V slopes. The bottom 18-feet of the shaft will be backfilled before attempting to remove the top 6-feet of shaft timbers and lagging. It is estimated that this opening will require 56 cubic-yards of backfill
will be borrowed from

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area must be stripped of vegetation and other objectionable materials.

Salvage and Replace Topsoil - All recoverable cover soil must be stripped from the area which will be disturbed by adit demolition and backfilling.

This cover soil will be stockpiled and later replaced on the regraded areas. Cover soil will be respread evenly and brought to a friable condition ready for seeding.

Adit Demolition and Backfilling - As shown on the Cross-Section and Regrading Profile, the first 74 feet of the adit and 13 feet of drift will be completely demolished by digging-out the timbers and lagging which provide support to the roof and walls. The adit excavation will begin at the portal where the adit roof is above the surface and extend into about 13 feet of cover at the end. Since the adit is 6-feet high, the maximum depth of the excavation will be around 19 feet. In areas where the backfill depth will be at least 10-feet above the adit floor, it will not be necessary to remove 100-percent of the timbers from the excavation. However, any timbers left in the opening must not interfere with effective backfilling. Mine timbers and other debris removed from the adit will be hauled to the local landfill. Because this adit continues underground beyond the point specified for demolition, the Contractor will be required to install a plug in the open adit before completing the backfilling operation.

After the mine timbers have been removed, the Contractor will backfill and regrade the trench created by the collapse and excavation of the adit and drift. The backfilled area will be graded as a broad swale draining toward the road and will be contoured to blend with adjacent terrain. Sideslopes along the swales will not exceed 3H:1V. The longitudinal profile of each swale will make a smooth transition from the regraded contours at the head of the disturbed area to the road elevation at the bottom. It is anticipated that approximately 320 cubic-yards of excavation will be required to uncover and remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades shown on the Cross-Section and Regrading Profile.

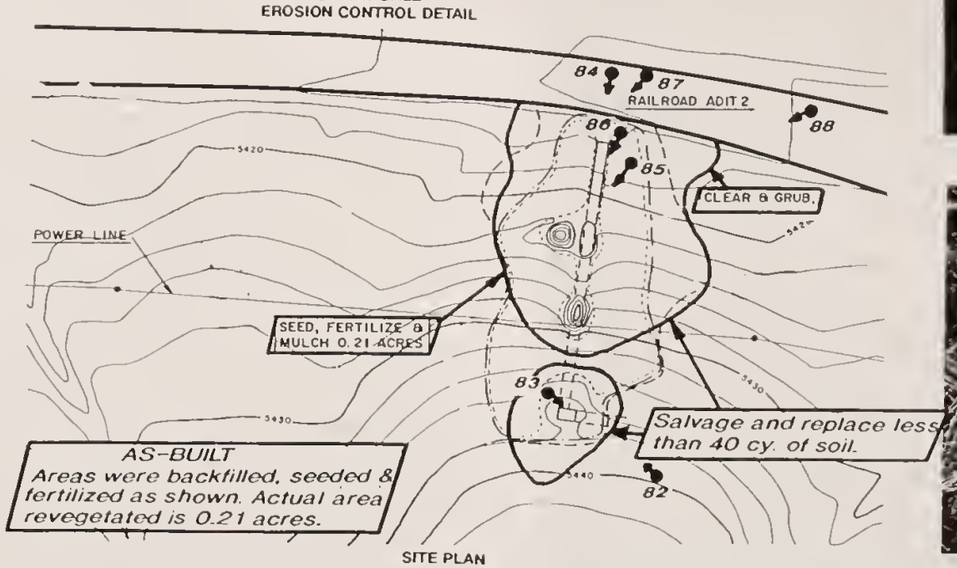
Adit Closure - At a distance of approximately 85-feet in from the portal, adit demolition will be stopped. At this point, a 5-ft long backfill plug will be installed inside the adit to seal the underground opening and to prevent subsidence. Plug length is measured along the roof from the brow of the opening back to the point where the top of the plug begins to slope down from the roof of the opening. The plug must provide complete blockage of the opening over the specified plug length. It is estimated that this plug will require 11 cubic-yards of backfill.

Fertilize, Seed, and Mulch - The total affected area including construction roads and stockpile areas must be graded then fertilized, seeded and mulched. Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed per acre, which is twice the application rate for drill seeding. Fertilizer will be applied at a rate of 92.5 lbs/acre. A grass hay or straw mulch shall be applied at a rate of 3,000 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free".

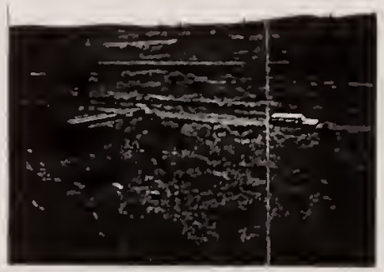
Straw Bales - The constructed swale will require straw bale erosion control measures as shown on the site plan. Approximately 7 bales will be required. Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads. Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free". Installation of the straw bales shall consist of two staggered rows across the full width of the swale. The straw bales shall be embedded into the ground a minimum of six (6) inches. Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches.

Railroad Adit 2 portal.

STRAW BALE EROSION CONTROL DETAIL



SITE PLAN



View of shaft bulkhead.

Looking into timber lined shaft

Adit roof exposed in subsidence holes end at the surface.

CONSTRUCTION PHOTOS

LAND & MINERAL OWNERSHIP

R.W. RICHTER & R.H. KEARNEY
RFD #2, P.O. BOX 23S
BUTTE, MT 59701
PHONE 406-792-6288

SITE PLAN AND GENERAL LAYOUT

RAILROAD ADIT 2 SITE

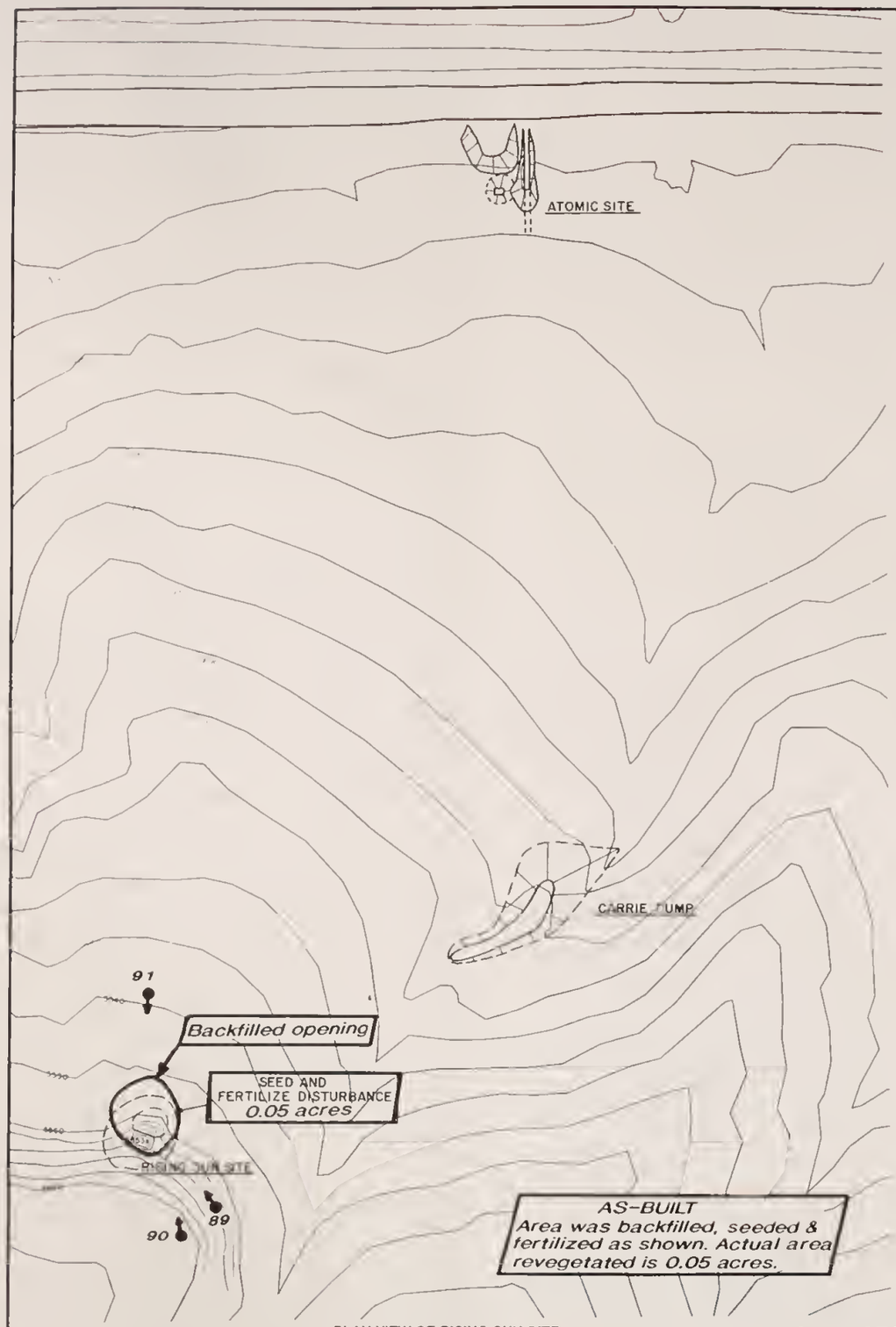
NW 1/4 OF SECTION 22, T3N R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE October 1994
DRAWN BY DLD
APPROVED BY DM
REVISIONS
NO. DATE BY
SHEET NO 15 of 20

AS-BUILT DRAWING
PHOTO INDEX



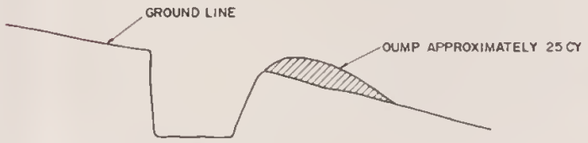
PLAN VIEW OF RISING SUN SITE

CONSTRUCTION PHOTOS

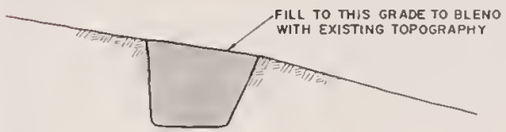
RISING SUN SITE WORK DESCRIPTION

Backfill Mine Openings - The Rising Sun Shaft will be backfilled with approximately 55 cubic-yards of material which can be excavated from the adjacent dump and from the surrounding area. The Contractor will grade the disturbed area to blend with the surrounding contours using maximum 3H:1V slopes. The unit price bid for backfilling will include all backfill and borrow area grading and any access preparation.

Seed and Fertilize - The disturbed areas at the Rising Sun Site will be seeded and fertilized. Due to the limited access requirements, access route reclamation is not anticipated; however, the Contractor will be required to reseed any access distrubance that the Owner's representative may order. Approximately 0.06 acres will need to be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds o nutrients per acre. It is estimated that 2.9 pounds of Pure-Live-Seed and 5.5 pounds of fertilizer will be required. After application, the reseeded area will be tracked. Raking may be substituted in areas that cannot be tracked. Seed certifications and documentation of the seed mix must be submitted for approval prior to application.



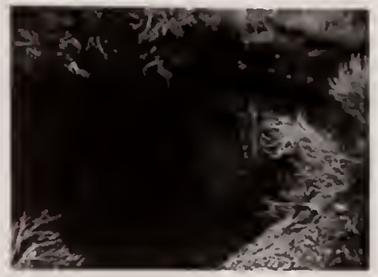
CURRENT CONDITION



FINAL CONFIGURATION

BACKFILL CROSS SECTION

View of surface around Rising Sun shaft and the adjacent dump.



View looking into the Rising Sun shaft.

LAND & MINERAL OWNERSHIP

ROBERT EVAN KEELING
1275 ROYAL BIRKDALE COURT
ROCKLEDGE, FLORIDA 32955
PHONE (407) 639-1371

SITE PLAN AND GENERAL LAYOUT

RISING SUN SITE

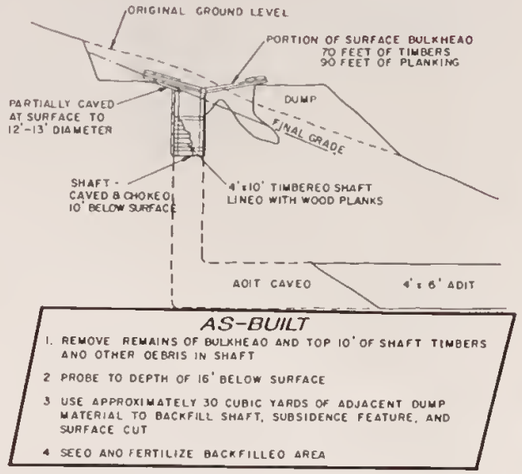
SW 1/4, NW 1/4 OF SECTION 22, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

DATE	October 1994
DRAWN BY	DLO
APPROVED BY	DM
REVISIONS NO.	DATE / BY
SHEET NO.	16 of 20

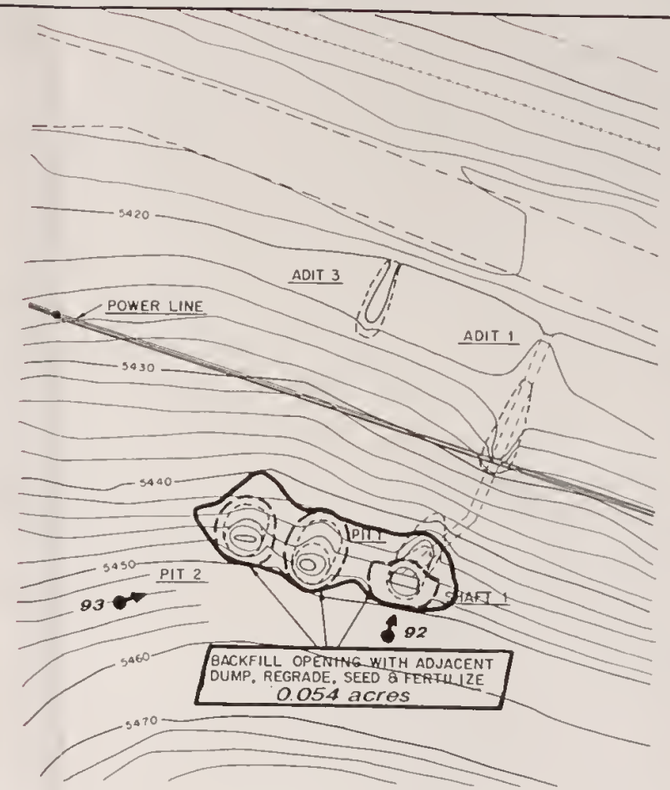
AS-BUILT DRAWING PHOTO INDEX



CROSS SECTION VIEW OF SHAFT #1

Remove & dispose of bulkhead components at Shaft 1.

View of surface cut and dump at Shaft 1. Entire dump will be consumed by borrow for Shaft 1 & Adit 1



PLAN VIEW FOR SHAFT 1, PIT #1 & PIT #2

Pit #1 – 5 1/2 ft. deep with top diameter of 14 ft. tapering to 4 1/2 ft. at the bottom. Backfill using adjacent dump material. Approximately 18 cubic yards.

Pit #2 – 5 ft. deep with top diameter of 18 ft. tapering to 8'x3' at the bottom. Backfill using adjacent dump material. Approximately 21 cubic yards

CONSTRUCTION PHOTOS

STORM KING WORK DESCRIPTION FOR SHAFT AND PITS

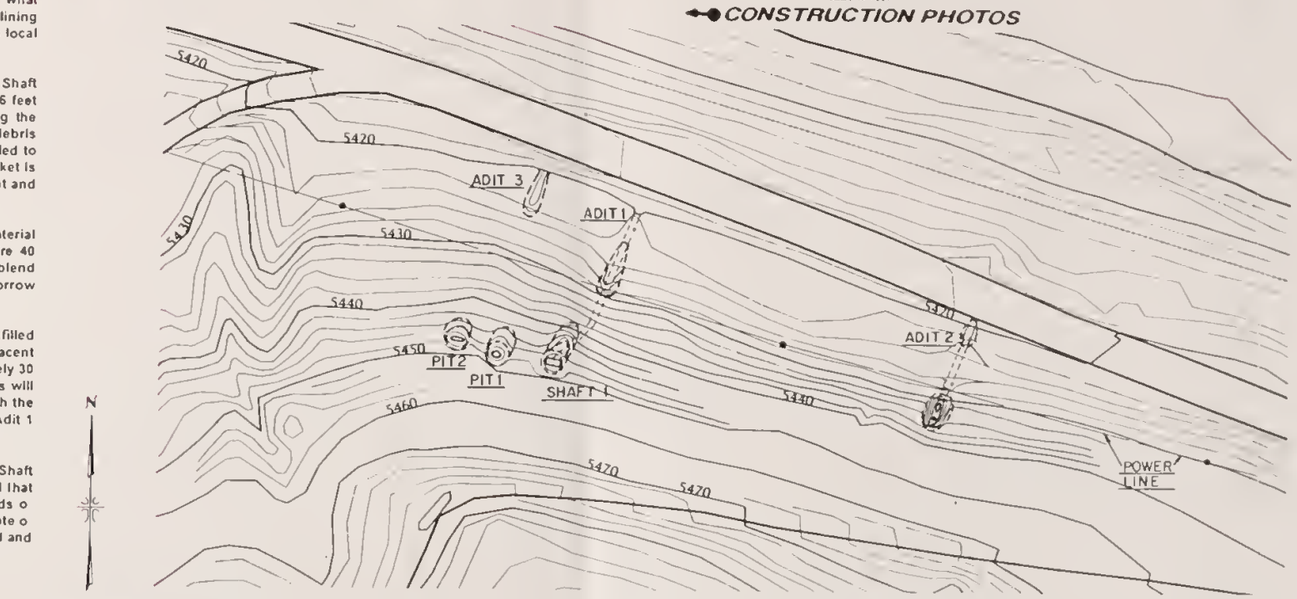
Bulkhead and Shaft Timber Removal - At Shaft #1, the Contractor will remove what remains of the surface bulkhead and the top 10 feet of timbers and wood planks lining the shaft. All debris from these operations must be collected and hauled to the local landfill.

Probe Mine Openings - Prior to backfilling Shaft #1, this opening will be probed. Shaft #1 will be probed to a depth of 16 feet below the collar. This will require about 6 feet of excavation below the point where the shaft is currently blocked. Probing the opening will be accomplished by digging out the mine timbers, rock, and other debris that could be choking the shaft. Any debris removed from the shaft will be hauled to the local landfill. A backhoe or excavator with a long reach and a 1-2 yard bucket is well suited for probing. Probe mine opening includes all excavation, replacement and disposal.

Backfill Mine Openings - Pits #1 and #2 will be backfilled to the surface with material from the adjacent mine dumps. It is estimated that these openings will require 40 cubic-yards of backfill. The area disturbed by construction will be regraded to blend with the surrounding contours. Areas on the dump which are disturbed by borrow excavation will be regraded with maximum 2½H:1V slopes.

Shaft #1 and the subsidence feature and surface cut associated with it will be backfilled to the grade indicated on the Shaft 1- Cross-Section using material from the adjacent dump. Backfilling the shaft and adjacent subsidence feature will take approximately 30 cubic-yards unless the shaft can be reopened by probing. The backfilled areas will regraded with slopes not exceeding 2½H:1V except where required to blend with the surrounding contours. Final grading of the mine dump will be included in the Adit 1 regrading.

Seed and Fertilize - The affected areas associated with Pits #1 and Pit #2 and the Shaft 1 backfill area will be seeded and fertilized by broadcast methods. It is estimated that 0.04 acres will be reseeded. Broadcast seeding will be used requiring 48 pounds of Pure-Live-Seed per acre. Fertilizer will be spread over the reseeded area at the rate of 92.5 pounds of nutrients per acre. It is estimated that 1.9 pounds of Pure-Live-Seed and 3.7 pounds of fertilizer will be required.



PLAN VIEW OF STORM KING SITE

LAND & MINERAL OWNERSHIP

R.W. RICHTER & R.H. KEARNEY
RFD #2, P.O. BOX 235
BUTTE, MT 59701
PHONE 406-792-6286

SITE PLAN AND GENERAL LAYOUT

STORM KING SITE
(1 OF 2)

SE 1/4 NW 1/4 OF SECTION 22 T3N R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
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DATE October 1994
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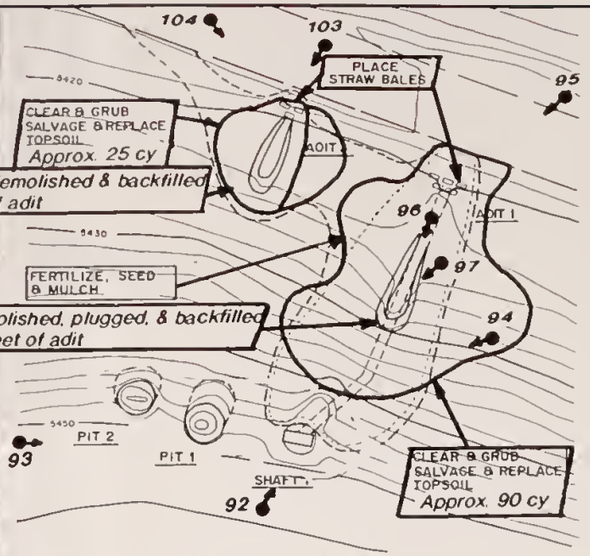
AS-BUILT DRAWING PHOTO INDEX

Adit 1 roof exposed at the surfeca for 55 feat.



PLAN VIEW OF ADITS 1 & 3

Adit 2 – Clear & grub, salvage end replace topsoil, demolish adit and backfill & revegetate.

CONSTRUCTION PHOTOS

STORM KING WORK DESCRIPTION FOR ADITS 1, 2, & 3

Clear and Grub - In order to prepare the site for topsoil salvage, the construction area must be stripped of vegetation and other objectionable materials

Salvage and Replace Topsoil - All recoverable cover soil must be stripped from the area which will be disturbed by adit demolition and backfilling.

It is estimated that 90 cubic-yards of soil will be salvaged in the disturbance area around Adit 1, that 60 cubic-yards of soil will be salvaged around Adit 2, and that 25 cubic-yards of soil will be salvaged at Adit 3. This cover soil will be stockpiled and later replaced on the regraded areas. Cover soil will be respread evenly and brought to a friable condition ready for seeding

Adit Demolition and Backfilling - Adits 1, 2, and 3 will be completely demolished by digging out the timbers and lagging which provide support to the roof and walls In areas where the backfill depth will be at least 10-feet above the adit floor, it will not be necessary to remove 100-percent of the timbers from the excavation However, any timbers left in the opening must not interfere with effective backfilling. Mine timbers and other debris removed from the adit will be hauled to the local landfill. After the mine timbers have been removed, the Contractor will backfill and regrade the trench created by the collapse and excavation of the adit Backfilled areas will be graded as a broad swales draining toward the road and will be contoured to blend with adjacent terrain. Sideslopes along the swales will not exceed 3H:1V The longitudinal profile of each swale will make a smooth transition from the regraded contours at the head of the disturbed area to the road elevation at the bottom.

The first *75* feet of the Adit 1 will be completely demolished The adit excavation will begin at the portal where the adit roof is near the surface and extend back to where the adit is caved and blocked under 15 feet of cover Since the adit is 6-feet high, the maximum depth of the excavation will be around 21 feet Regraded contours will blend with adjacent terrain and with the backfilled area at Shaft #1 It is anticipated that approximately 450 cubic-yards of excavation will be required to uncover and remove the mine timbers Approximately the same volume will be required to backfill the resulting trench to the grades shown on the Adit 1 Cross-Section and Regrading Profile

The first *53* feet of the Adit 2 will be completely demolished The adit excavation will begin at the portal where the adit roof is near the surface and extend back to where the adit is caved under 8 feet of cover Since the adit is 6-feet high, the maximum depth of the excavation will be around 14 feet. Because this adit could continue underground beyond the point where it is caved and blocked, the Contractor will be required to probe for an opening and install a plug if an opening is found It is anticipated that approximately 100 cubic-yards of excavation will be required to uncover and remove the mine timbers Approximately the same volume will be required to backfill the resulting trench to the grades shown on the Adit 2 Cross-Section and Regrading Profile

The Contractor will be required to dig out the timbers and lagging exposed in the 24-foot long collapsed portion of Adit 3 The maximum depth of the excavation will be around 10 feet. It is anticipated that approximately 20 cubic-yards of excavation will be required to remove the mine timbers. Approximately the same volume will be required to backfill the resulting trench to the grades specified on the site plan Because this adit could continue underground beyond the point where it is caved and blocked, the Contractor will be required to probe for an opening and install a plug if an opening is found

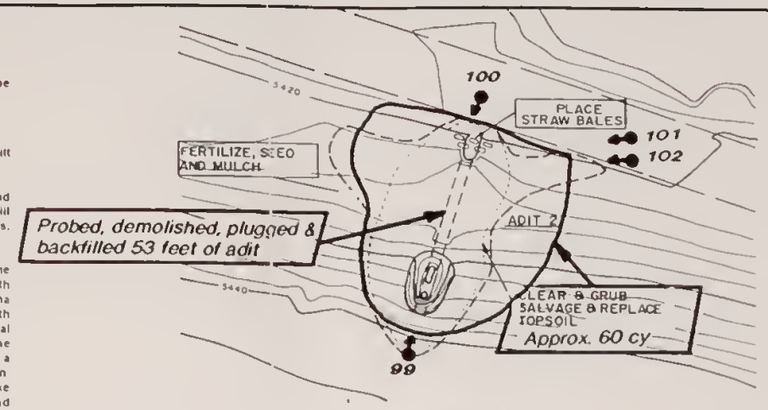
Probe Mine Openings - Prior to backfilling Adit 2 and Adit 3, these openings will be probed Adit 2 and Adit 3 will be probed for a distance of 5 feet from the point where the adits are currently caved and blocked. Probing the opening will be accomplished by digging out a sufficient amount of the caved material to determine if the caved portion of the adit extends beyond this distance Mine timbers and other debris that may be choking the adits will be removed and hauled to the local landfill. If the adit is determined to be sufficiently caved, the excavation will be backfilled as part of this operation. If the adit is reopened, an adit closure will be required

Adit Closure - *For Adit 1 & Adit 2* 10-foot long backfill plugs will be installed inside these adits to seal the underground openings. Plug length is measured along the roof from the brow of the opening back to the point where the top of the plug begins to slope down from the roof of the opening The plug must provide complete blockage of the opening over the specified plug length

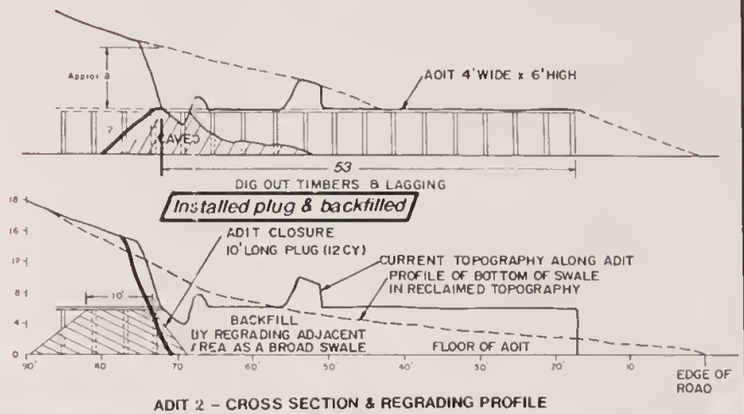
Fertilize, Seed, and Mulch - All areas disturbed (including roads and stockpile areas) at Adit 1, Adit 2, and Adit 3 will be seeded, fertilized and mulched The total area involved in the reclamation of these areas is estimated at 0.313 acres Any areas that are seeded by the broadcast method will require an application rate of 48 pounds of pure live seed (PLS) per acre, which is twice the application rate for drill seeding Fertilizer will be applied at a rate of 92.5 lbs/acre A grass hay or straw mulch shall be applied at a rate of 3,000 pound per acre and shall be anchored by crimping. Mulch will be "Montana Certified Weed Seed Free"

Straw Bales - All constructed swales will require straw bale erosion control measures as shown on the site plan Approximately *17* bales will be required Straw bales used for erosion control shall be clean grain straw, shall be free of noxious weeds and shall not contain greater than 5% cereal seed by weight, i.e. seed heads Written confirmation from the County Agent or Weed Board will be required stating that the straw is "Montana certified weed seed free" Installation of the straw bales shall consist of two staggered rows across the full width of the swale The straw bales shall be embedded into the ground a minimum of six (6) inches Bales shall be anchored by two (2) wood stakes driven into the ground at least fifteen (15) inches

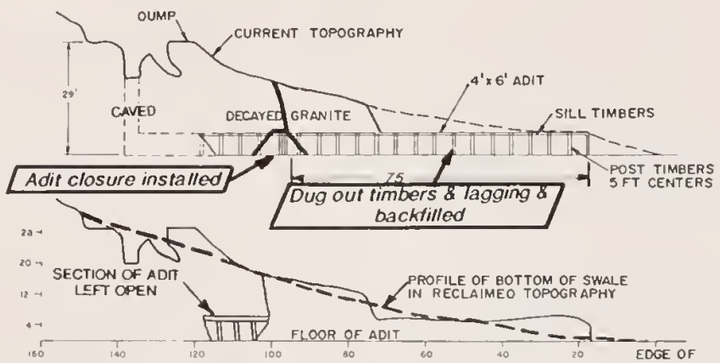
AS-BUILT
Areas were probed, demolished, plugged, backfilled, seeded & fertilized & mulched as shown. Actual area revegetated is approx. 175 acres.



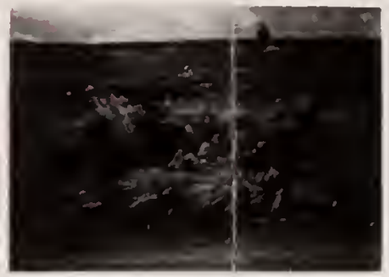
PLAN VIEW OF ADIT 2



ADIT 2 – CROSS SECTION & REGRADING PROFILE



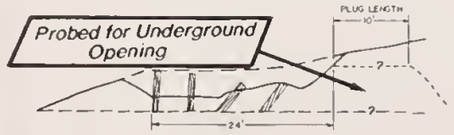
ADIT 1 – CROSS SECTION & REGRADING PROFILE



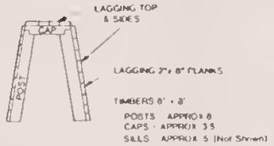
Adit 2–Clear and grub, salvage end replace topsoil, demolish and backfill adit, probe opening, (plug open adit if required) and revegetate.

Looking downhill at subsidence hole & exposed Adit 2 roof

Adit 3–Clear and grub, salvage and replace topsoil, demolish and backfill adit, probe openings, (plug open adit if required) and revegetate.



ADIT 3 – CROSS SECTION



TYPICAL ADIT TIMBER CONSTRUCTION

SITE PLAN AND GENERAL LAYOUT

STORM KING SITE

(2 OF 2)

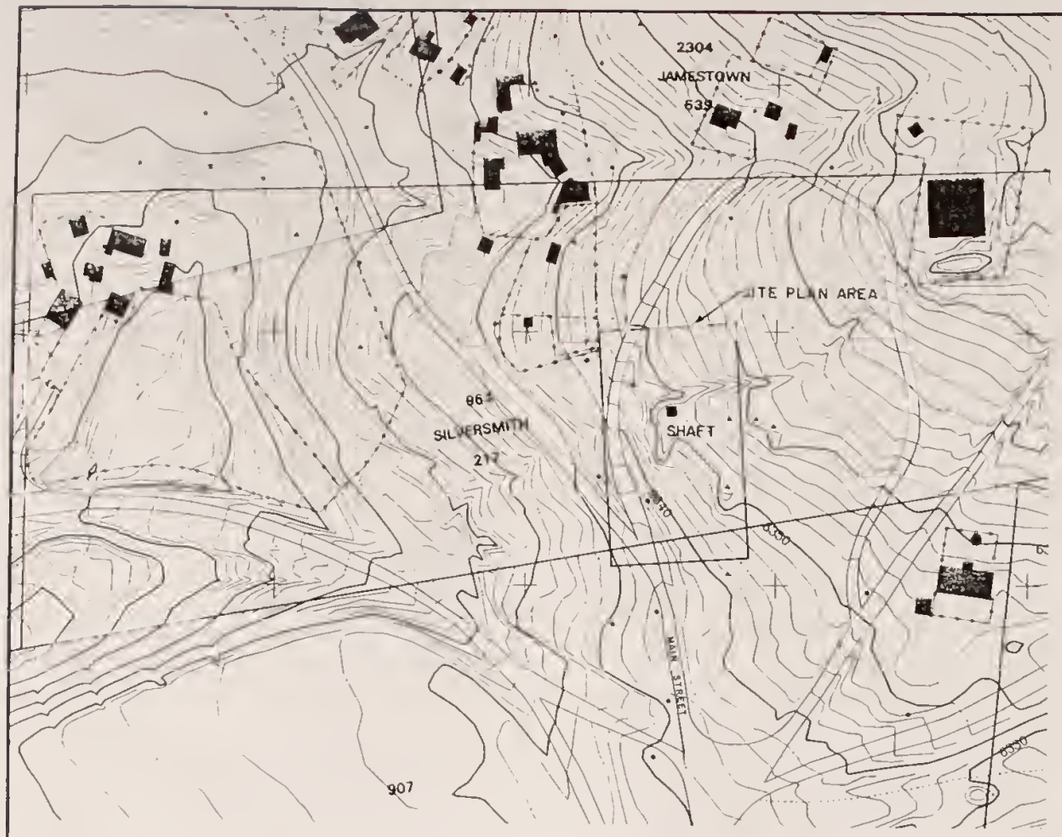
SE 1/4 NW 1/4 OF SECTION 22, T3N, R8W
SILVER BOW COUNTY MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

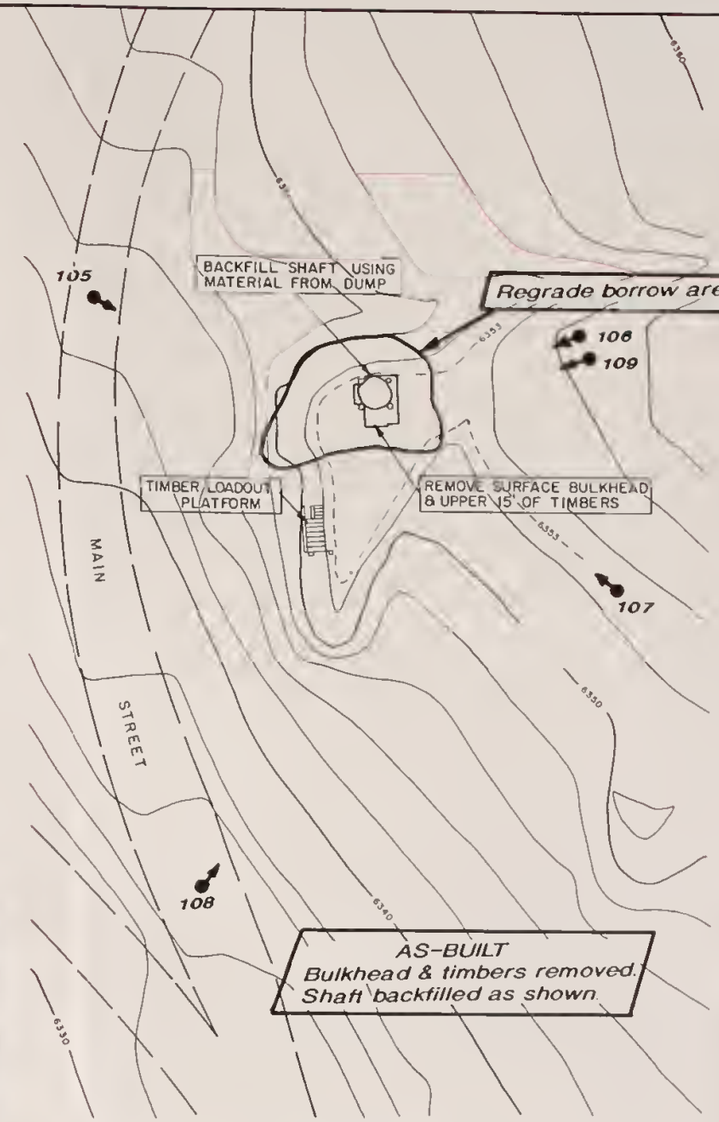
SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE	October 1994
DRAWN BY	DLD
APPROVED BY	DM
REVISIONS NO	DATE / BY
SHEET NO	18 of 20

AS-BUILT DRAWING PHOTO INDEX

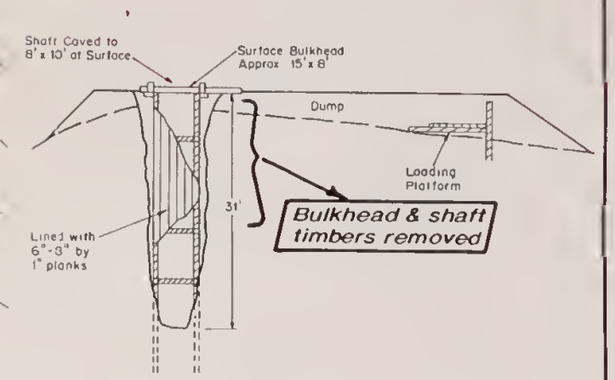


SILVERSMITH LOCATION MAP



PLAN VIEW OF SILVERSMITH SITE

View of surface bulkhead.



NORTH–SOUTH SECTION THROUGH SHAFT & DUMP

View of dump and loading platform.

SILVERSMITH SITE WORK DESCRIPTION

Bulkhead and Shaft Timber Removal - The Contractor will remove what remains of the surface bulkhead and the top 15 feet of timbers and wood planks lining the shaft. All debris from these operations must be collected and hauled to the local landfill. The shaft timbers should not be removed until the shaft has been backfilled to within 15-feet of the surface. It is estimated that these operations will generate approximately 20 cubic-yards of debris.

Backfill Mine Openings - The shaft will be backfilled to the surface using material from the adjacent dump. Backfilling the shaft will take approximately 70 cubic-yards. The Contractor will use appropriate means to compact the fill. Borrow areas will be regraded with slopes not exceeding 2½H:1V except where required to blend with the surrounding contours.

View of Silversmith headframe and collar area before headframe was pulled down.

View of Silversmith Site with headframe still standing.

CONSTRUCTION PHOTOS

View of the Silversmith headframe laying on the mine dump.

LAND & MINERAL OWNERSHIP

NORTH BUTTE MINING CO.
P.O. BOX 188
BUTTE, MT 59703

SITE PLAN AND GENERAL LAYOUT

SILVERSMITH SITE

SW1/4 SE1/4 OF SECTION 1, T3N, R8W
SILVER BOW COUNTY, MONTANA

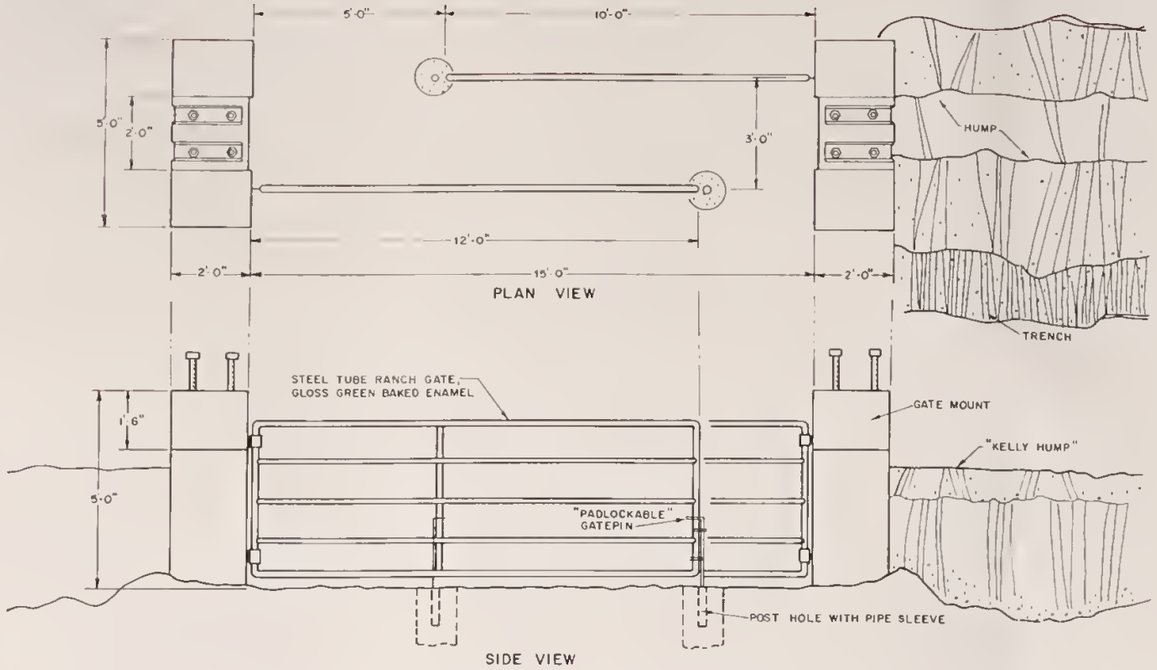
STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone 406-259-2412

DATE April 1995
DRAWN BY DLD
APPROVED BY DM
REVISIONS
NO. DATE BY

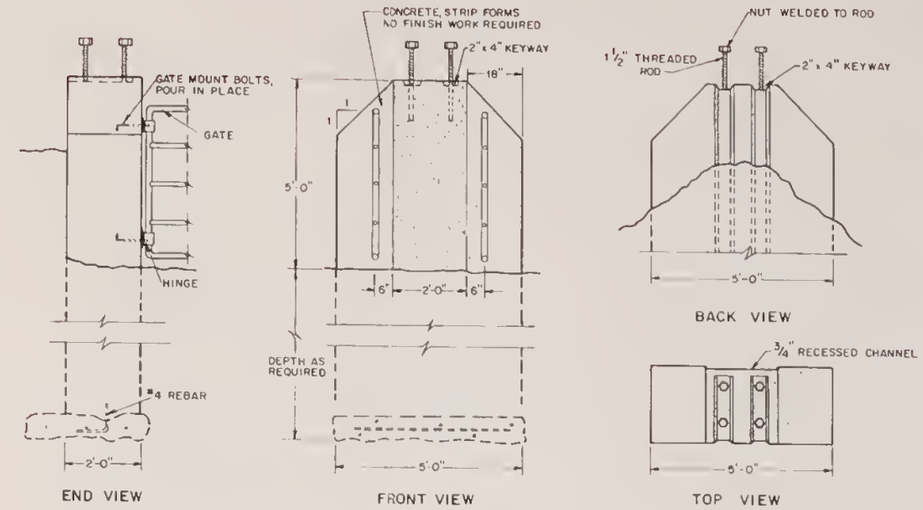
SHEET NO 19 of 20

AS–BUILT DRAWING PHOTO INDEX



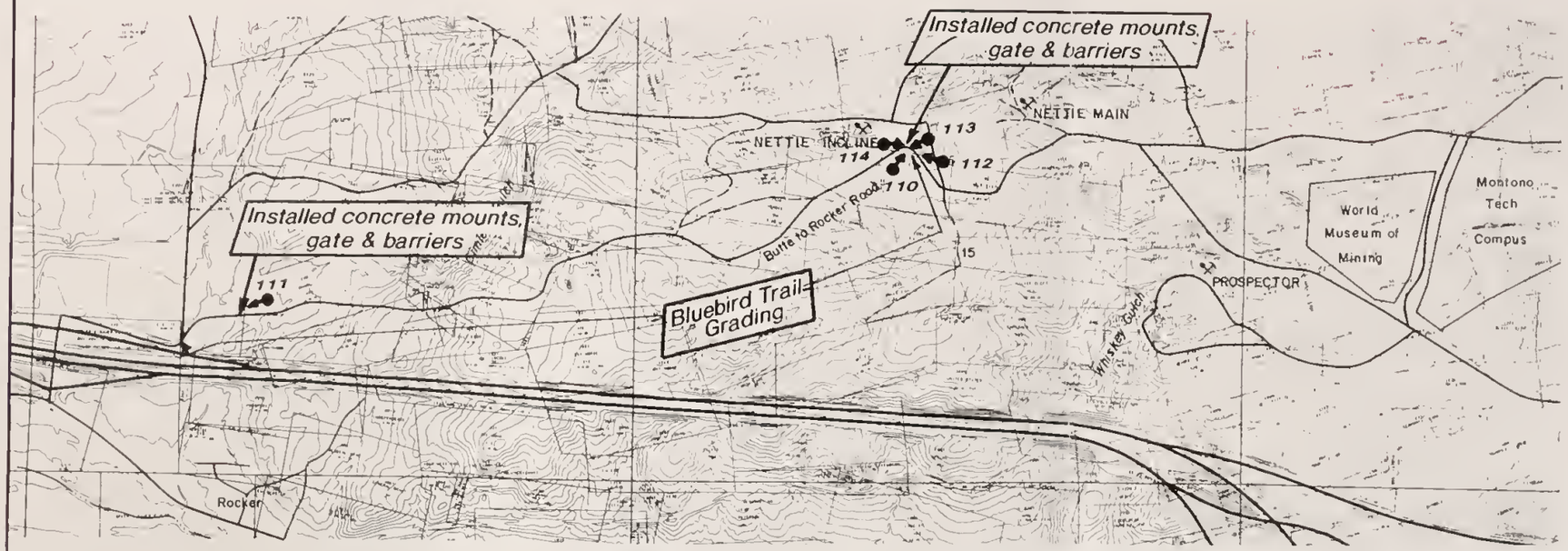
GATEWAY & "KELLY HUMP" DETAIL

SCALE IN FEET



CONCRETE GATE MOUNT DETAILS

SCALE IN FEET



SITE MAP

CONSTRUCTION PHOTOS

BLUEBIRD TRAIL WORK DESCRIPTION

Bluebird Trail Grading - Grading shall consist of blading and shaping the roadbed which is approximately 12-15 feet wide to remove ruts, washes, sloughs, and other irregularities that prevent normal runoff from the road surface. Shallow ruts, chuckholes, and washes will be removed by scarifying or cutting to the bottom of such defects. Deep ruts, chuckholes, and washes will be removed by filling and compacting to the extent possible under the existing conditions. The road will be graded with a uniform inslope or outslope across the entire width of the road to provide drainage. Existing drainage dips will be reshaped. At the conclusion of the grading and shaping operation, the roadbed will be dressed to produce to a smooth grade and cross-section.

The section of road specified for grading is generally indicated on the Site Location Map. If added to the work requirements, the section of road to be graded will be staked in the field by the Owner's representative.

Bluebird Trail Concrete Barrier and Gate Installation - Two concrete barrier and gate systems will be installed. A barrier and gate system will be installed at each end of the Bluebird Trail at locations which are to be selected and staked by the Owner's Representative. Each concrete barrier and gate installation will be constructed as shown on the details on this drawing.

SITE PLAN AND GENERAL LAYOUT

BLUEBIRD TRAIL

SECTIONS 15 & 16, T3N, R8W
SILVER BOW COUNTY, MONTANA

STATE OF MONTANA, DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1625 Eleventh Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

DATE	June 1995
DRAWN BY	DLO
APPROVED BY	WCM
REVISIONS NO	DATE / BY
SHEET NO.	20 of 20

AS-BUILT DRAWING PHOTO INDEX

ATTACHMENT 7

PHOTOGRAPHS/SLIDES

PHOTO LISTING

PHOTOS/SLIDES

WEST BUTTE HMO PROJECT
PHOTO & SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
1	10-13-95	Contractor's equipment - Michigan 110-11 scraper
2	10-17-95	Contractor's equipment - Caterpillar 12E motor grader
3	10-26-95	Contractor's equipment - Case 580 backhoe/loader
4	10-15-95	Contractor's equipment - John Deere 792 Excavator
5	05-12-94	Pre-construction - Apex #1
6	05-12-94	Pre-construction - Apex #1 Incline
7	05-12-94	Pre-construction - Apex #1 Incline, Trench, and Pits
8	05-12-94	Pre-construction - Apex #1 Trench, and Pits
9	10-17-95	Apex #1 - Seed and Fertilize
10	05-12-94	Pre-construction - Apex #2
11	05-12-94	Pre-construction - Apex #2, looking into shaft
12	10-17-95	Apex #2 - Seed and Fertilize
13	10-17-95	Apex #2 - Seed and Fertilize
14	05-12-94	Pre-construction - Great Republic #2
15	05-12-94	Pre-construction - Great Republic #2, looking into subsidence
16	10-11-95	Great Republic #2 - Probing
17	05-12-94	Pre-construction - Great Republic #3
18	10-17-95	Great Republic #2 & #3 - Seed and Fertilize
19	05-12-94	Pre-construction - Great Republic #4
20	05-12-94	Pre-construction - Great Republic #4
21	10-17-95	Great Republic #3 & #4 - Seed and Fertilize
22	05-12-94	Pre-construction - Great Republic #5
23	10-17-95	Great Republic #5 - Seed and Fertilize
24	05-12-94	Pre-construction - Nemo South
25	05-12-94	Pre-construction - Nemo South
26	05-12-94	Pre-construction - Nemo South, debris in shaft

WEST BUTTE HMO PROJECT
PHOTO & SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
27	10-11-95	Pre-construction - Nemo South, view from the Apex
28	10-13-95	Nemo South - Regraded Pit #1 with shaft backfill in the background
29	10-13-95	Nemo South - Regraded Depressions B, C, and D
30	10-13-95	Nemo South - Regraded Pit #2 area with mound over shaft on the right side
31	10-13-95	Nemo South - Relocated road
32	10-17-95	Nemo South - Seed and Fertilize mound over shaft
33	10-17-95	Nemo South - Broadcasting seed
34	10-16-95	Pre-construction - Nettie Main, looking southwest across caved shaft
35	10-17-95	Nettie Main - Backfilling with JD 755 track loader and scraper
36	10-17-95	Nettie Main - Loading scraper at Hibernia borrow area
37	10-17-95	Nettie Main - Dumping scraper load at backfill area
38	10-19-95	Nettie Main - Backfilling and contouring view looking west
39	10-19-95	Nettie Main - View of graded backfill looking north toward the borrow area
40	10-19-95	Nettie Main - Seed and Fertilize
41	10-16-95	Pre-construction - Nettie Main, view of Hibernia borrow area
42	10-16-95	Pre-construction - Nettie Main, view of Hibernia borrow area
43	10-19-95	Nettie Main - View of regraded Hibernia borrow area
44	10-19-95	Nettie Main - View of regraded Hibernia borrow area
45	05-11-94	Pre-construction - Nettie Incline
46	05-11-94	Pre-construction - Nettie Incline, portal housing in subsidence
47	10-17-95	Nettie Incline - Seed and Fertilize backfilled area
48	05-12-94	Pre-construction - Olson Fraction #1 Structure
49	10-17-95	Olson Fraction - Olson Fraction #1, structure removed and opening regraded

WEST BUTTE HMO PROJECT
PHOTO & SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
50	05-12-94	Pre-construction - Olson Fraction #2
51	10-17-95	Olson Fraction - Olson Fraction #2, shaft backfilled and regraded
52	06-09-94	Pre-construction - Plutus Dump
53	07-14-94	Pre-construction - Plutus, Mound over wooden shaft bulkhead
54	10-18-95	Plutus - Constructing forms for footings around choked shaft
55	10-18-95	Plutus - Pouring concrete for footings
56	10-18-95	Plutus - Setting anchor plates in footings
57	10-31-95	Plutus - Load of Tri-deck beams broke loose and dumped on road
58	10-31-95	Plutus - Lateral crack in beam was repaired by manufacturer after installation
59	10-31-95	Plutus - Using crane to install beams over shaft
60	11-09-95	Plutus - Securing end plates on cover
61	11-09-95	Plutus - Placing grading fill around shaft cover
62	11-09-95	Plutus - Seeding the disturbed area around shaft cover
63	07-14-94	Pre-construction - Prospector, shaft covered by mound and wood cover
64	10-11-95	Prospector - Setting rebar for footings around choked shaft
65	10-16-95	Prospector - Constructing forms for footings around choked shaft
66	10-17-95	Prospector - Pouring concrete for footings
67	10-17-95	Prospector - Setting anchor plates in footings
68	10-30-95	Prospector - Delivering Tri-Deck Beams
69	10-30-95	Prospector - Using crane to install beams over shaft
70	11-09-95	Prospector - View of cover before placing grading fill around beams
71	11-09-95	Prospector - Placing grading fill around beams
72	11-09-95	Prospector - View of completed Tri-Deck beam shaft cover
73	10-12-95	Pre-construction - Atomic

WEST BUTTE HMO PROJECT
PHOTO & SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
74	10-12-95	Atomic - Recovering cover soil
75	10-12-95	Atomic - Adit demolished 64 feet back from the portal
76	11-09-95	Atomic - Site completed with mulch crimped and bales for erosion control installed
77	11-09-95	Atomic - Site completed
78	10-11-95	Pre-construction - Railroad Adit 1
79	10-11-95	Railroad Adit 1 - Adit demolished 55 feet back from the portal
80	10-11-95	Railroad Adit 1 - Adit closure installed near end of adit
81	11-09-95	Railroad Adit 1 - Site completed with mulch crimped and bales for erosion control installed
82	06-08-94	Pre-construction - Railroad Adit 2, view of shaft
83	06-08-94	Pre-construction - Railroad Adit 2, looking into shaft
84	10-11-95	Pre-construction - Railroad Adit 2. adit portal
85	10-12-95	Railroad Adit 2 - Adit demolished 74 feet back from the portal and drift demolished for 13 feet
86	10-12-95	Railroad Adit 2 - Adit closure was required between backfilled shaft and demolished section of adit.
87	10-12-95	Railroad Adit 2 - Adit and shaft backfill graded; shaft timber debris in background
88	11-09-95	Railroad Adit 2 - Site completed with mulch crimped and bales for erosion control installed
89	10-27-95	Pre-construction - Rising Sun
90	10-27-95	Rising Sun - Shaft backfilled and graded
91	10-27-95	Rising Sun - Seed and Fertilize
92	06-08-94	Pre-construction - Storm King Shaft 1
93	06-08-94	Pre-construction - Storm King Pits 1 and 2
94	10-20-95	Storm King - Seeding Shaft 1, Pit 1, and Pit 2
95	06-08-94	Pre-construction - Storm King: Adit 1, Shaft 1, Pit 1, and Pit 2

WEST BUTTE HMO PROJECT
PHOTO & SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
96	10-11-95	Storm King - Adit 1 demolished 75 feet back from the portal, stopped short because of excavator couldn't break through rock cover
97	10-11-95	Storm King - Adit 1 plugged with about 15 feet of open adit remaining behind adit closure
98	10-11-95	Storm King - View of regraded site
99	06-09-94	Pre-construction - Storm King Adit 2 showing subsided areas
100	06-09-94	Pre-construction - Storm King Adit 2 view of portal from road
101	10-20-95	Storm King - Adit 2, fertilizing regraded site
102	11-09-95	Storm King - Adit 2 completed with mulch crimped and bales for erosion control installed
103	06-08-94	Pre-construction - Storm King Adit 3
104	11-09-95	Storm King - Adits 1 and 3 completed with mulch crimped and bales for erosion control installed
105	10-12-95	Pre-construction - Silversmith
106	10-12-95	Silversmith - Shaft backfilled
107	10-12-95	Silversmith - Backfill and borrow areas graded
108	10-12-95	Silversmith - Headframe moved away from shaft
109	10-18-95	Silversmith - Completed with debris from shaft timbers hauled to dump
110	10-30-95	Bluebird Trail - Removing forms from concrete gate mounts at east end of trail
111	10-31-95	Bluebird Trail - Pouring concrete gate mounts at west end of trail
112	11-09-95	Bluebird Trail - Digging Kelly Humps at east end of trail
113	11-09-95	Bluebird Trail - East gate completed
114	11-09-95	Bluebird Trail - Finishing work on west gate

CONTRACTOR'S EQUIPMENT

4

APEX SITE

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13

GREAT REPUBLIC SITE

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NEMO SOUTH SITE

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NETTIE MAIN SITE

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NETTIE INCLINE SITE

OLSON FRACTION SITE

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PLUTUS SITE

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PROSPECTOR SITE

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PC

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72

ATOMIC SITE

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76

RAILROAD ADIT 1 SITE

81

RAILROAD ADIT 2 SITE

86

88

85

87

RISING SUN SITE

STORM KING SITE

96

98

95

97

99

100

101

102

103

104

SILVERSMITH SITE

108

109

BLUEBIRD TRAIL

113

114